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ABSTRACT

Based on the idea that active participation stimulates the processes by which learning takes place, this document provides teachers and students with a variety of information and learning activities that deal with plants and animals in nature. Basic concepts are presented through the use of laboratory experiments, worksheet exercises, diagrams, and individual and group activities. The materials focus on: (1) microscopic organisms; (2) sponges; (3) the life cycle of a tapeworm; (4) insects and insect pests; (5) brine shrimp; (6) fish; (7) snakes; (8) the similarities between bones and eggshells; (9) birds; (10) protection coloration; (11) whales; (12) biological communities; (13) flowers and fruits; (14) seeds; (15) the art of drying flowers; and (16) plant dyes. Included are reproducible handouts, quizzes, and an answer key. (TW)

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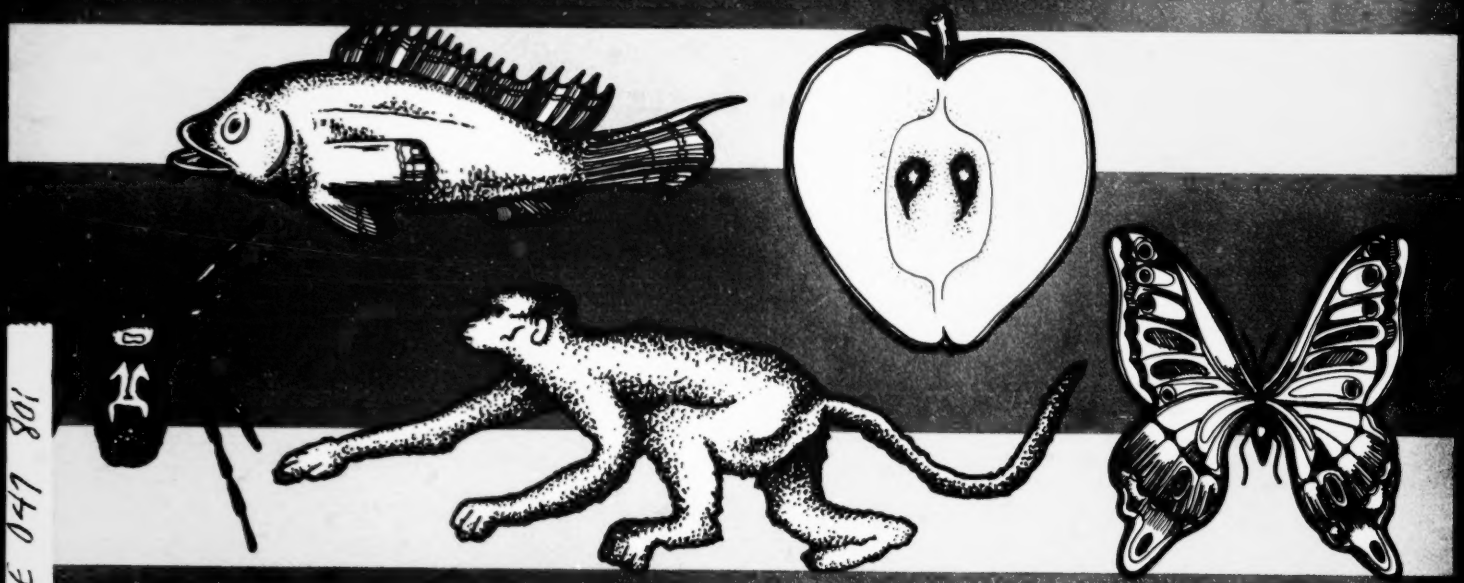

SE 047 801

Jim Conway

Plants and Animals in Nature

by
Lorraine Conway

illustrated by Linda Akins

Cover by Vanessa Filkins

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Introduction

Every student should be acquainted with nature if he is to be truly educated and if he is to understand the world in which he lives. The future of our planet may well depend on how well we know and understand the world around us. In order to effectively use the plants and animals which share this planet with us, we must have knowledge of their life cycles, habits, environmental responses and structural characteristics. This book will help students learn by experimentation and activities an area of science that covers living and growing things.

How to Make a Culture of Protozoa

Protozoa are simple one-celled organisms that belong to a group of living things called protists. Protozoa are composed mainly of a nucleus, protoplasm, and a cell membrane. They are found on land and in fresh and salt water. Some protozoa group themselves into colonies. In most cases the one cell of a protozoan has the ability to carry on all the functions of life; it can move, break down food for energy, get rid of waste products, reproduce, and use oxygen for respiration.

To make your own culture for viewing protozoans under the microscope, follow the directions below.

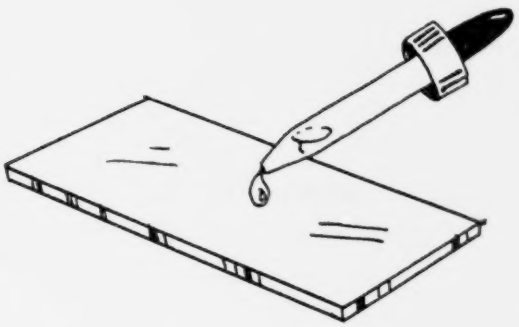
MATERIALS: A jar of water from a pond or stream, dried hay or grass from a field or roadside, microscope, slides, cover slides and an eyedropper

PROCEDURE: Put several handfuls of the dried grass or hay into the jar of pond water. Do not cap the jar. Allow the protozoa several weeks to reproduce in great numbers so that they will be easy to find under the microscope. Check your culture in about three weeks by taking samples of the culture from several places in the jar. You should have a variety of organisms to study. Keep the culture and reexamine it again in a week or two. Note any differences you notice in number and kinds of protozoa.

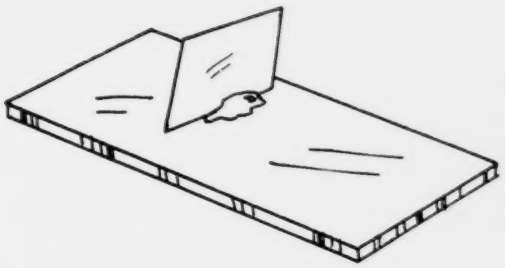
How to Make a Wet Slide

MATERIALS: Glass slide, cover slide, eyedropper, culture, pencil

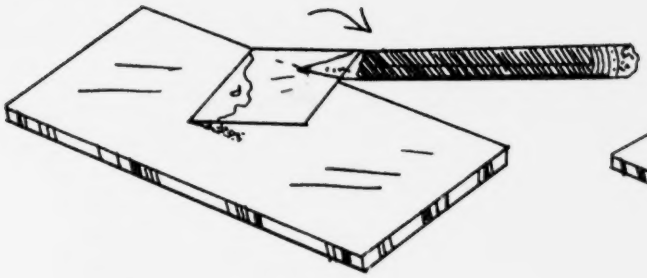
PROCEDURE: Follow the steps below.



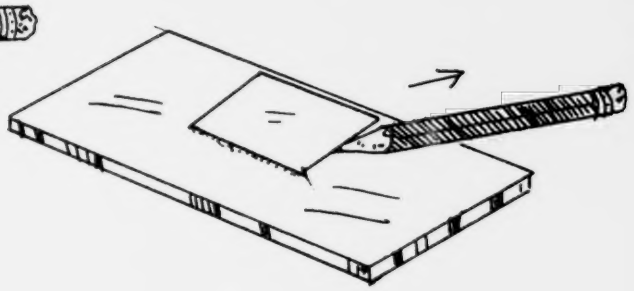
1. Put a drop of culture on the center of the slide.



2. Place a cover slide at a right angle to the slide with the edge of the cover slide at the edge of the drop of culture.



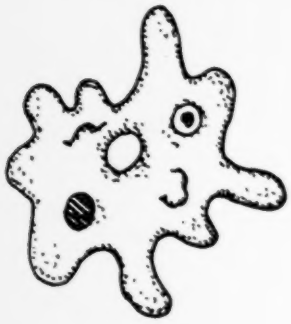
3. Use a pencil to gently lower the cover slide. If you drop the cover slide, the slide will be full of air bubbles.



4. When the pencil touches the top of the slide, slowly pull the pencil out from under the cover slide.

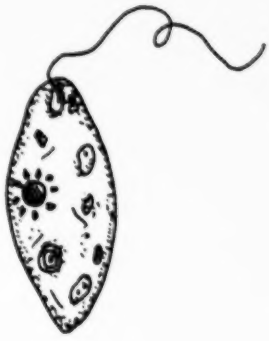
Identification of Protozoa

A drop of pond water may contain some or all of the following organisms. Match them to their descriptions at the bottom of the page.



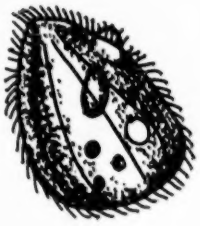
a Amoeba

b Stentor

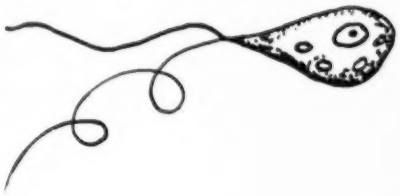


c Euglena

d Paramecium



e Colopodium



f Bodo

1. _____ This slipper-shaped protozoan is covered with short, hairlike projections called cilia.

2. _____ This one-celled creature is horn-shaped.

3. _____ This protozoan has no definite shape.

4. _____ This one-celled organism is sometimes considered to be a plant because it has the ability to make its own food. It can also propel itself through the water with its single whip or flagellum.

5. _____ This protozoan is well-rounded and covered with cilia.

6. _____ This microscopic organism uses two whips or flagella for food gathering and movement in freshwater ponds.

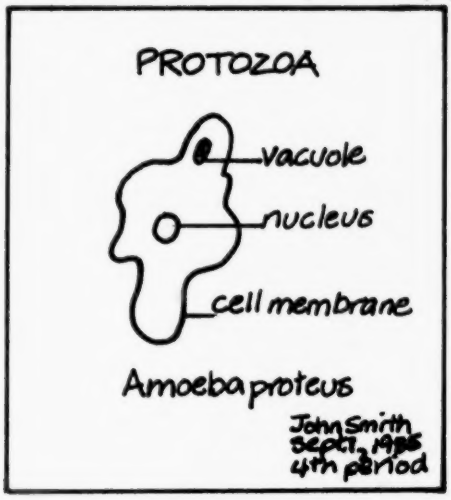
Rules for a Biological Drawing

The ability to draw accurately and neatly is a useful skill, especially in science. Most artists follow some basic rules to make their drawings attractive and easy to read. Below are some rules which will improve your drawing skills.

1. Use unlined paper.
2. Draw in pencil.
3. Always print.
4. Leave at least a one-inch margin on all four sides of the paper.
5. Center the title and print it in capital letters.
6. Center the drawing on the page.
7. Never cross lines.
8. Never use the plural form of a word when pointing to a single object or part.
9. Do little or no erasing.
10. When using the scientific name of an organism in places other than the title, remember that the genus or first part of a scientific name is always capitalized. The species or second part of a scientific name is not.

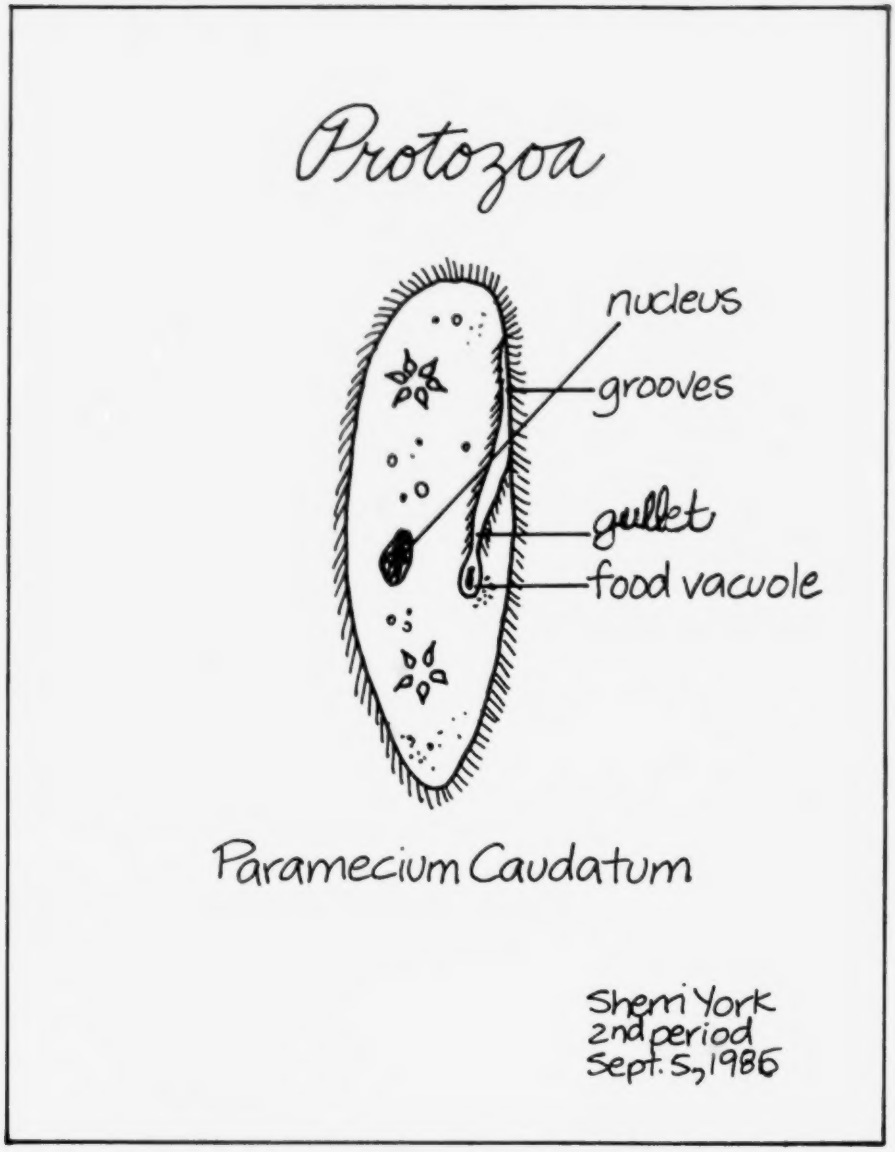
    FOR EXAMPLE: Canis familiaris is the genus and species name for a dog. In a title it would be CANIS FAMILIARIS

11. Print your name and other information as specified by your teacher.



Rules for a Biological Drawing

Below is a biological drawing with several errors. Circle all the errors you can find and make a correction next to each error.



Review the rules for a biological drawing. The next time you do a biological drawing be sure to observe the rules you have learned.

Sponges

Sponges are simple animals most of which live in salt water. Because of their appearance they were once considered to be plants. Sponges that are sold in stores are either natural or man-made. Man-made sponges are usually cut into definite shapes and are dyed to make them more attractive. Most natural sponges do not have definite shapes and are usually a yellow-tan color. Sponges are very useful because of their ability to soak and hold water in their many pores. To learn more about a sponge's ability to hold water, do the following experiment:

MATERIALS: Natural sponge, artificial sponge, balance or scale, water, bowl, paper towels

PROCEDURE: Weigh the dry natural sponge. Note its weight in Table 1. Soak the sponge in a bowl of water for a few minutes. Pick up the sponge and hold it over the bowl until the excess water drains off. Weigh the saturated sponge and note its weight in Table 1. Clean up with the paper towels and repeat the experiment with the man-made sponge. Fill in Table 2. Use the paper towels to clean up and dry the balance.

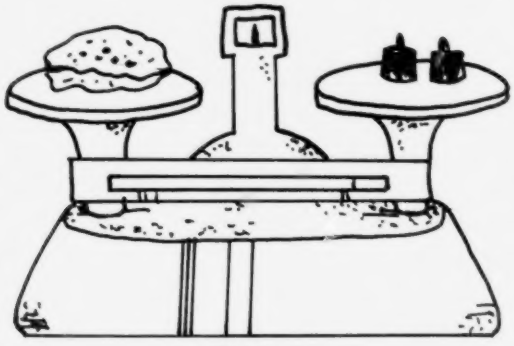


Table 1

1	2	3	4
Weight of dry natural sponge	Weight of saturated natural sponge	Weight of water absorbed Column 2 − Column 1	Percent of water absorbed Column 3 ÷ Column 1

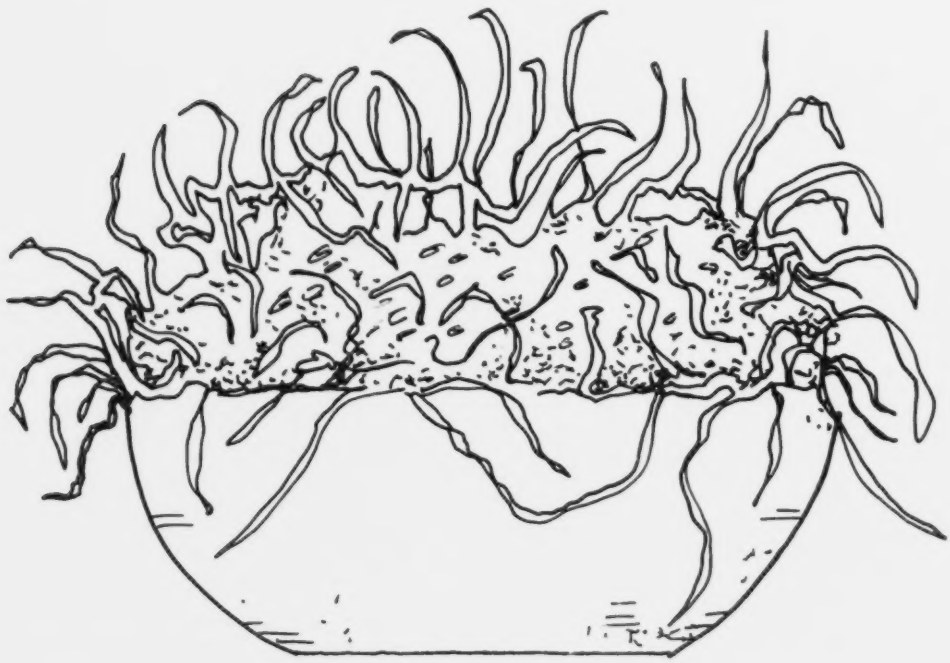
Table 2

Weight of dry man-made sponge	Weight of saturated man-made sponge	Weight of water absorbed Column 2 − Column 1	Percent of water absorbed Column 3 ÷ Column 1

From your research, which kind of sponge is capable of holding more water, a natural sponge or an artifical sponge?

A Sponge Garden

To show the ability of sponges to absorb and hold water in their pores, do the following experiment:



MATERIALS: Sponge, bowl, water, grass seed or birdseed, empty spray bottle

PROCEDURE: Moisten a sponge with water and then squeeze out the excess moisture. Put the sponge into the bowl. Carefully sprinkle grass seed into the pores of the sponge. For a nice, full garden be certain that the seeds are spread evenly. Gently moisten with water daily by using the spray bottle.

VARIATIONS: Make several gardens using different kinds of seeds, different sizes of sponges, commercial and natural sponges. Try keeping one sponge in the dark.

Make a Nature Mobile

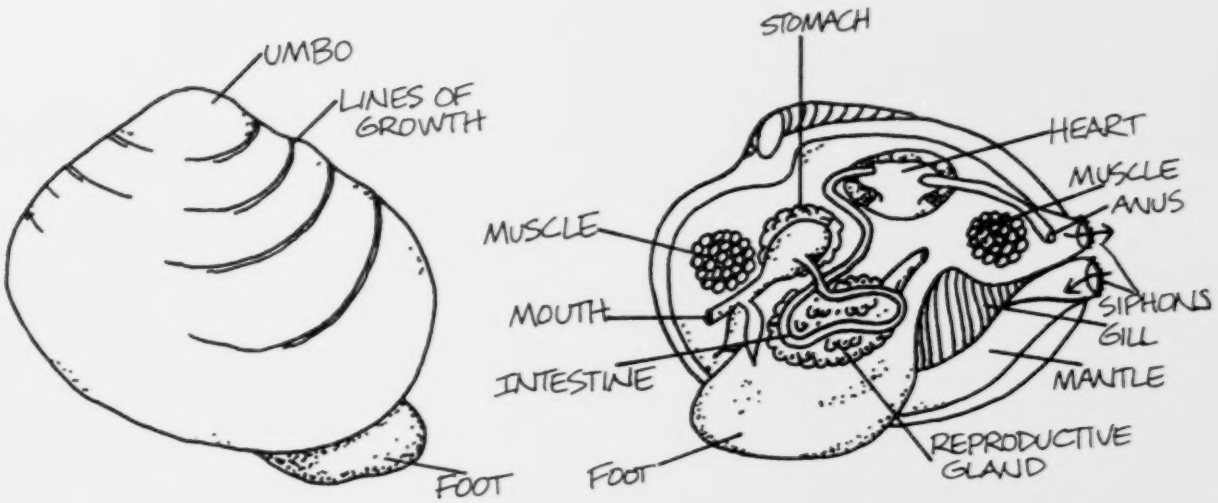
The next time you take a nature field trip, walk through the woods or along the seashore, keep your eyes open for interesting things to put on a nature mobile. Start with an interesting stick that has fallen to the ground. Find seedpods, feathers, dried flowers or anything else that may appeal to you. Look out for different textures and colors to make your mobile interesting. When you are near the seashore you may want to collect small shells, sand dollars, driftwood and other interesting things that wash ashore for this purpose. Use clear fishing line and glue for fastening objects to the stick. A small electric drill is handy but not necessary for drilling holes in the shells and wood. Hang from the ceiling and enjoy nature inside.

A Clam Dissection

The structure of a clam's body is very different from ours. Clams are invertebrate animals that breathe by means of gills and live in fresh or salt water. To see how the body of a clam is designed to carry on its life's functions, try dissecting a clam.

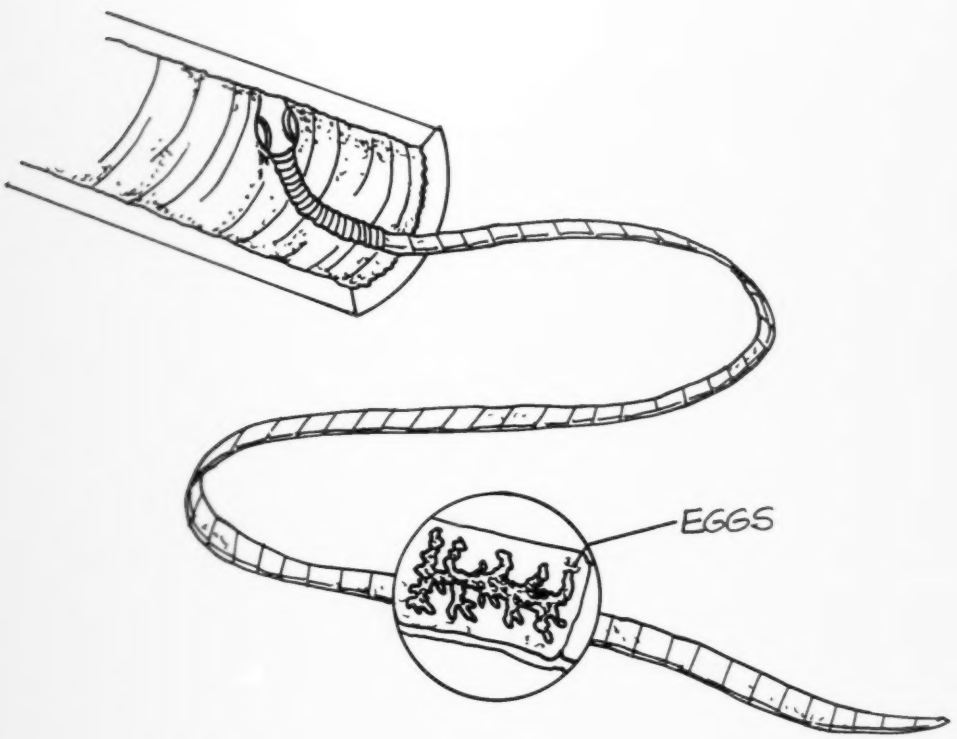
MATERIALS: Fresh or preserved clam, dissecting tray or pan, scalpel or knife

PROCEDURE: Preserved clam should be well-rinsed in water. Slide the scalpel carefully between the shells and cut the muscles at opposite ends of the shells. Make the cuts toward the hinge or umbo as shown in the drawing above. Trim any part of the mantle that clings to the top shell. Do this without cutting into the body of the clam. Use the drawing to locate the parts of the clam. Make one cut lengthwise across the thickest part of the clam to trace the path of the intestine.



What Are Tapeworms?

Tapeworms are so named because of their long, flat shape. Tapeworms are parasites; that is to say, they are living organisms which live in or on other living organisms. The organisms which feed and house the tapeworms are called hosts. Some kinds of tapeworms require more than one host to complete their life cycles. Most tapeworms have hooks or suckers on their heads for attaching themselves to their hosts, but they do not have mouths. Tapeworms absorb their food directly through their body walls as it has already been broken down for them by the host. Once attached, tapeworms grow rapidly, sometimes reaching a length of thirty feet in some unusual cases. To effectively treat tapeworm infection, the head of the worm must be expelled; otherwise it will continue to grow. The best ways to prevent infection are by sanitary practices, such as carefully washing the hands before eating, and by eating properly cooked meats, especially pork.



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The Life Cycle of a Tapeworm

Cycle means circle; the life of a tapeworm seems to go around in circles with no beginning and no end as you will soon see. By following the directions in this exercise, you will put the various stages of the pork tapeworm, Taenia solium, into a circle representing its life cycle. First cut out all the pieces on the following page; next arrange them according to the directions in the six steps below.

1. In the 12 o'clock position, put the piece of the life cycle which shows a man eating a sandwich with ham infested with the immature tapeworms called bladderworms. The ham in the sandwich was not properly cooked.

2. In the 2 o'clock position, a bladderworm has come out of the ham (pig muscle) and has attached itself by hooks and suckers to the wall of the man's intestine.

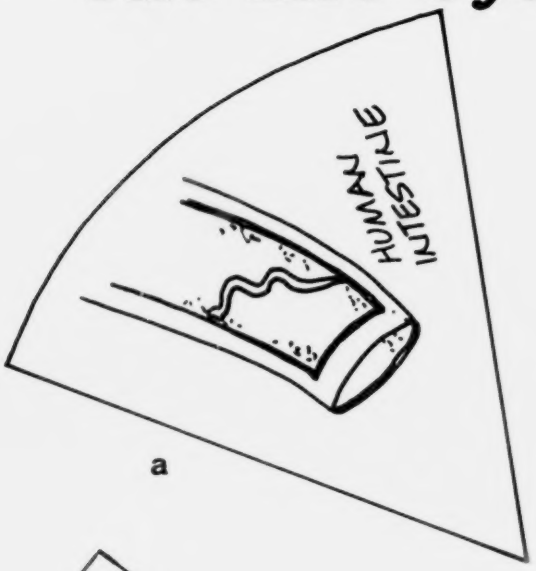
3. In the 4 o'clock position, the tapeworm has grown into a mature worm capable of producing millions of eggs which are released daily into the man's intestine and are passed out of his body.

4. In the 6 o'clock position, the eggs, which have made their way into the soil, are waiting to be swallowed by another animal, such as another pig.

5. If a pig picks up the eggs from the soil or from garbage, it will become infected with bladderworms which will make their way into the pig's muscle. This piece belongs in the 8 o'clock position.

6. The 10 o'clock piece shows a ham from the infected pig. This ham may be eaten by other humans to continue the cycle.

The Life Cycle of a Tapeworm



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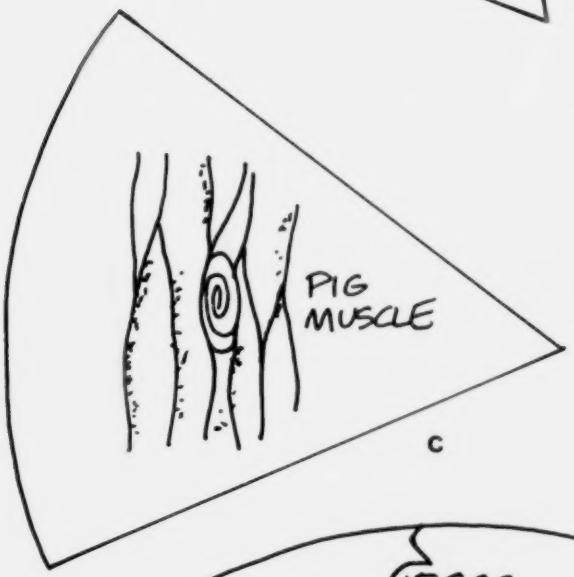
b



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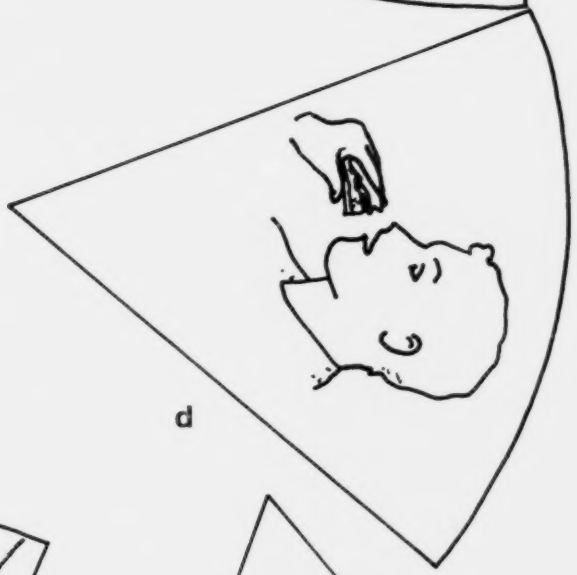

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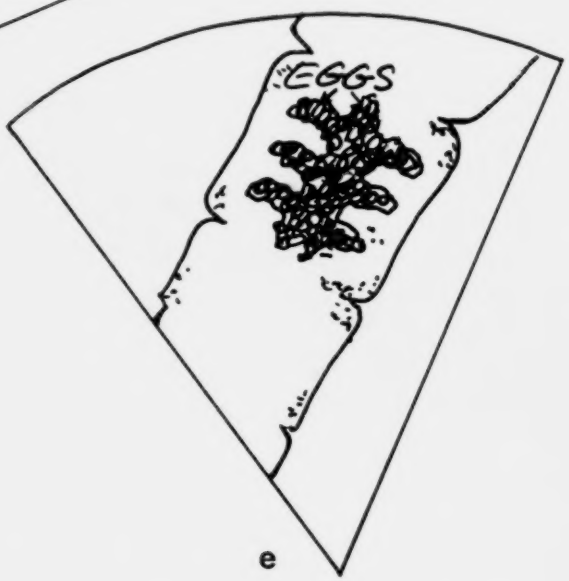

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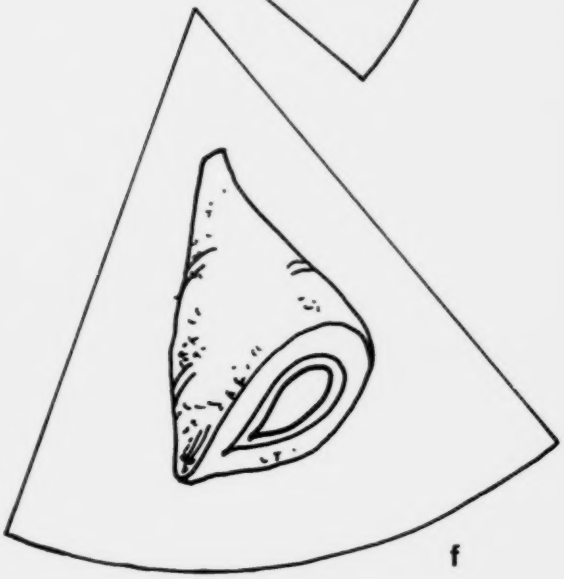

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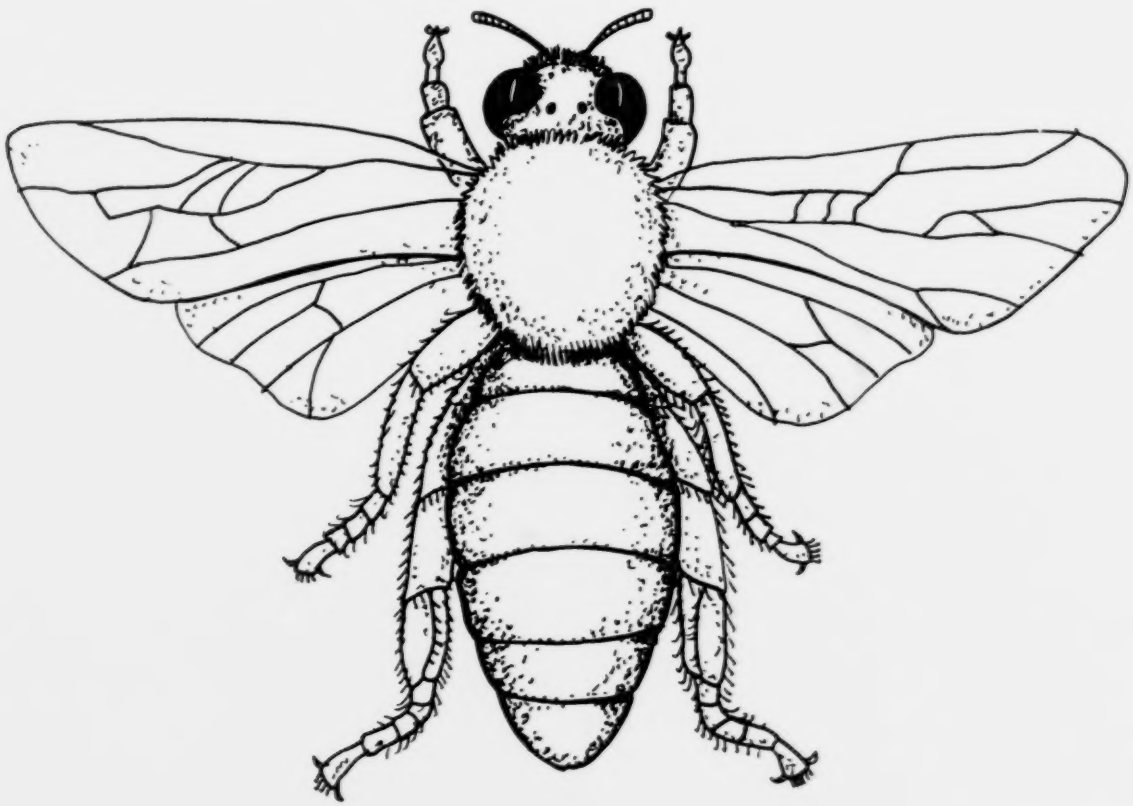
18

What Are Insects?

Insects are a very successful class of arthropods. They reproduce in great numbers to make up for the fact that their lifespans are usually short, in some cases only one day. Because insects do not live a very long time, they are guided by their instincts from the time of their birth to their death.

All insects have six legs, two antennae and three main body parts. In addition, most insects have two pairs of wings. Insects compete with man for food, destroy crops, carry disease and can be annoying pests. They also pollinate flowers, produce silk and honey and help to decay dead matter.

The parts of a typical insect are shown below.



Queen Honeybee

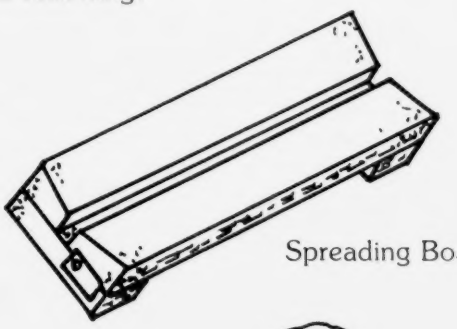
Find the six legs, one pair of antennae, three main body parts and two pairs of wings.

Making an Insect Collection

To make an insect collection, you will need the following:

Killing Jar

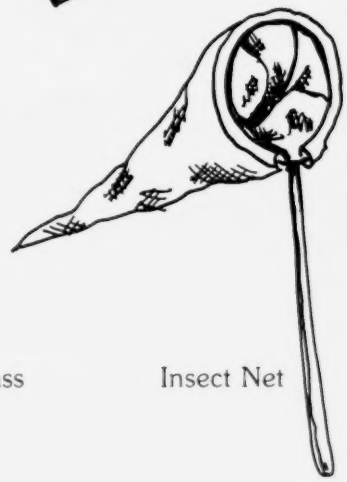
Tweezers



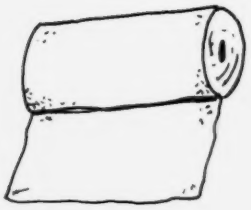
Spreading Board

Straight or Insect Pins

Magnifying Glass



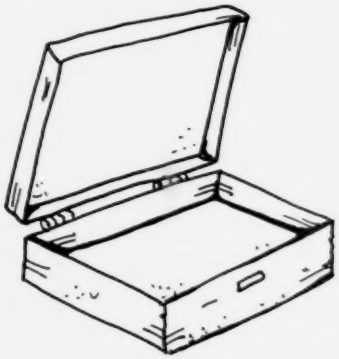
Insect Net



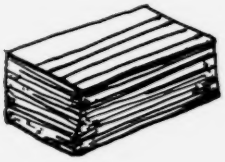
Paper Towels

Cotton Balls

Carbon Tetrachloride



Box

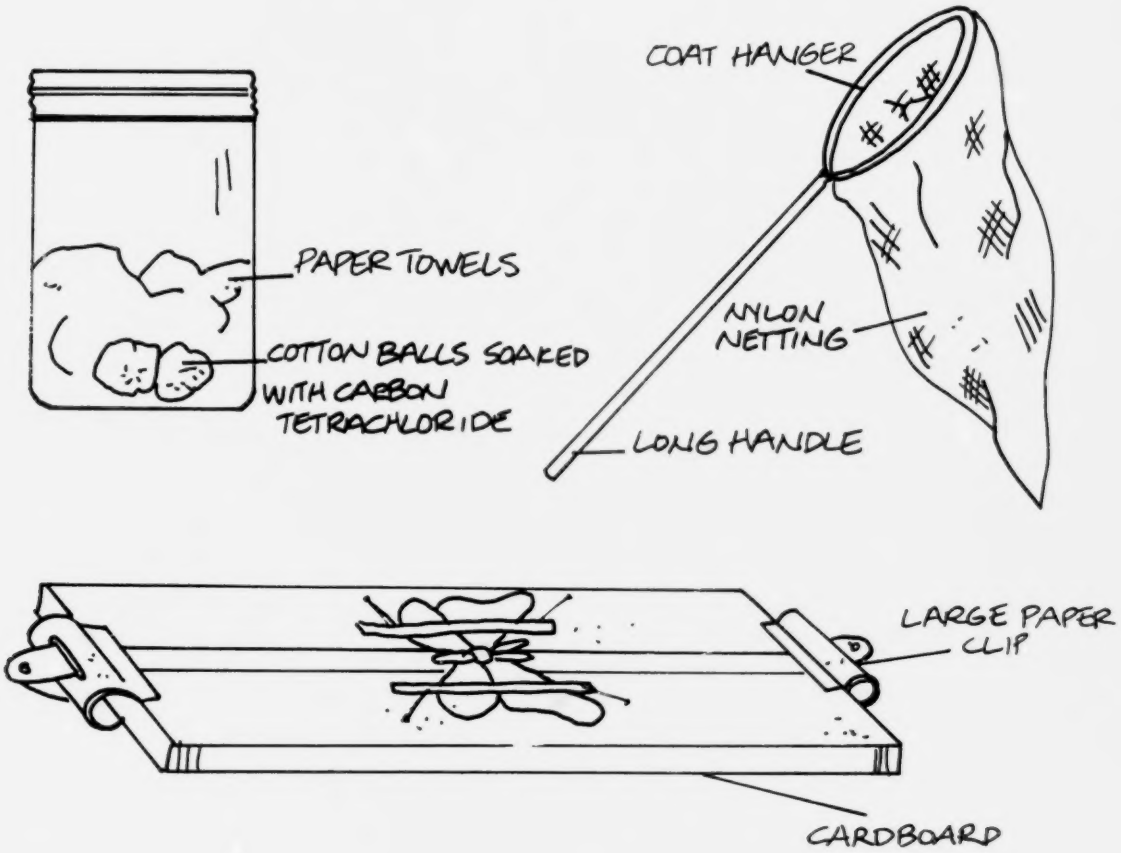


Index Cards

Hints for making your own killing jar, insect net and spreading board are on the next page.

Making an Insect Collection

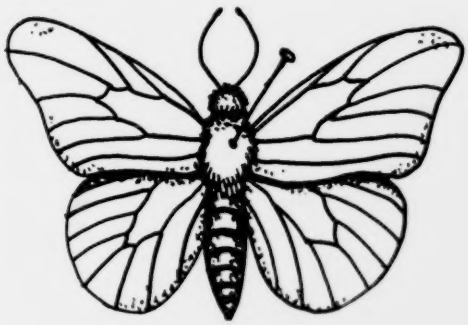
To make your own killing jar, use a jar with a tight-fitting lid. When you are about to go insect-hunting, soak some cotton balls in carbon tetrachloride.* Remove them with tweezers and do not inhale the fumes. Put the cotton balls in the killing jar and crumple some paper towels above them. Cap the jar. (Moth crystals or fingernail polish remover can be used in place of the carbon tetrachloride, but they do not work as well.) An insect net can be easily made from a coat hanger, long handle and nylon netting. Spreading boards can be purchased or made from layers of thick cardboard and large-size paper clips as shown below. Ordinary straight pins can be used for mounting; if you purchase insect pins, size 3 pins work best for most insects.

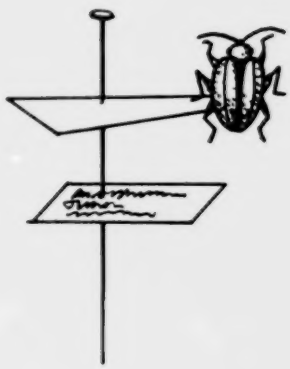


*Carbon tetrachloride is dangerous to inhale. It should be used only by responsible students or the teacher. Fingernail polish remover or moth crystals can be used instead. They do not kill the insects as quickly but are safer.

Making an Insect Collection

Once you have caught and killed some insects, you will need to mount them. Butterflies and moths are mounted with all four wings spread out as shown in the drawings below. Strips of paper cut from index cards will hold the wings in place while they are drying. Use tweezers to handle the insects and a magnifying glass for looking at details. Allow mounted insects to dry several days on the spreading board until they are stiff; then place them in a box, such as a cigar box, for safekeeping. Keep a few mothballs in your insect boxes as your insect collection makes fine food for other insects.





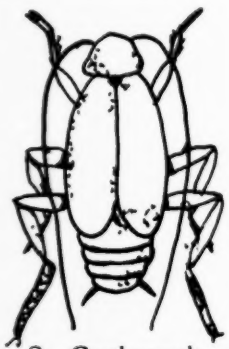
If you do not have time to mount your insects soon after they have been killed, they may become stiff. To relax them, make a softening jar by putting wet sand in a jar. Place a piece of paper toweling over the wet sand. Tightly cap the jar and keep in a warm place until the insects are flexible. Place the pins in the insects as shown above. Put the name of the insect, the date and place of its capture on the tag. Your name can also be put on the tag or box.

Helpful or Harmful?

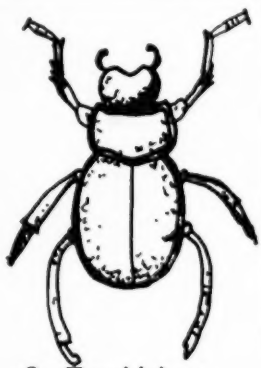
Some of the insects on this page are considered to be helpful to man; others are harmful. Indicate helpful or harmful by circling the correct term under each drawing. Give reasons for your choice of answers.

1. Flea

Helpful Harmful



2. Cockroach
Helpful Harmful



3. Tumblebug
Helpful Harmful

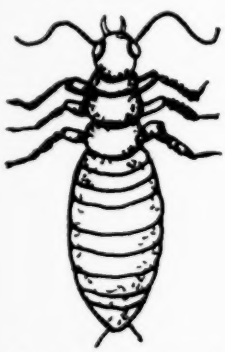
4. Mosquito

Helpful Harmful

5. Butterfly

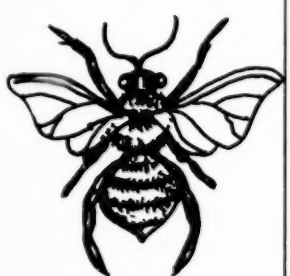
Helpful Harmful

6. Termite



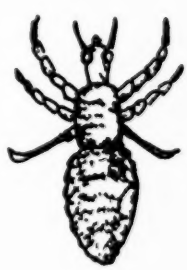
Helpful Harmful

7. Bumblebee



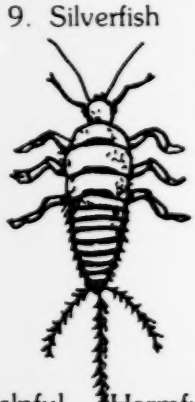
Helpful Harmful

8. Louse



Helpful Harmful

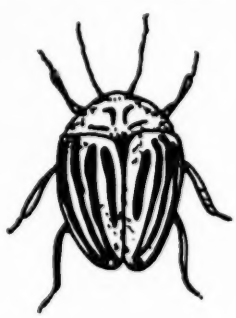
9. Silverfish



Helpful Harmful

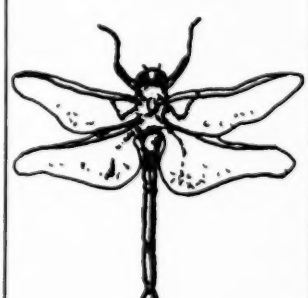
10. Praying Mantis
Helpful Harmful

11. Potato Beetle



Helpful Harmful

12. Dragonfly



Helpful Harmful

How to Capture a Spider's Web

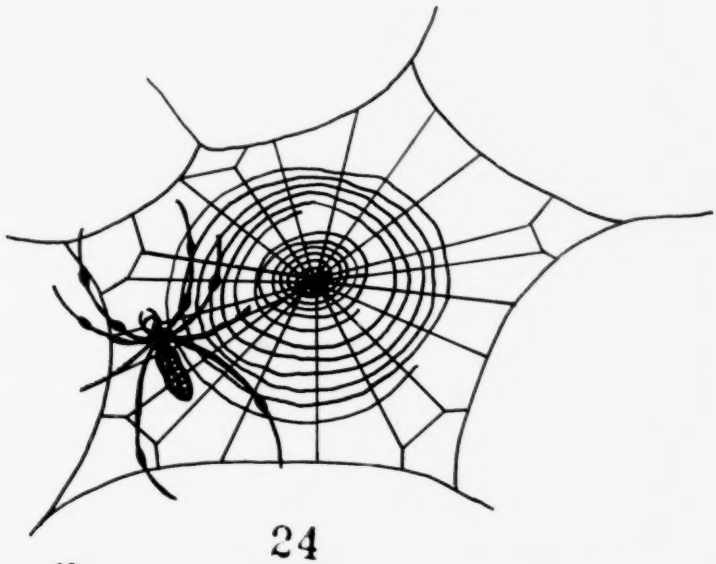
Spiders belong to the class of arthropods called arachnids. Their name was taken from an ancient mythological story about a girl named Arachna who was an excellent spinner and weaver.

There are about 30,000 different kinds of spiders. Some spiders can live on very high mountains; others can live under water. Perhaps the most unusual feature of spiders is their ability to spin webs. Spiderwebs are made of a special kind of silk; they are very strong and are used to catch insects.

Spiders differ from insects in that they have eight legs and no antennae. They are closely related to scorpions, daddy longlegs, mites and ticks. To capture a spider's web, follow the directions below.

MATERIALS: A spider's web, spray glue, clear spray or spray paint, cardboard or two panes of glass, tape

PROCEDURE: When you have found a suitable web, gently spray it with the clear spray or paint. Be careful not to soak the web. While the paint is still damp, mount it on the cardboard or glass by working from behind the web. Spray again with glue. If you are mounting the web on glass, it is not necessary to spray with glue. Just cover it with the top pane of glass and tape the edges together. Be careful if you work with glass; mounting on cardboard is much safer.

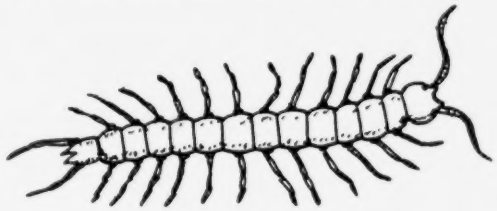


Can You Tell the Difference?

Invertebrate Animals

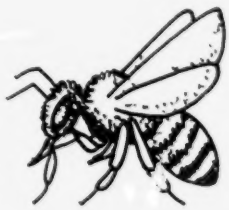
The drawings below and on the next page show pairs of animals which are often confused. Can you tell by looking at the drawings which animal is which and explain the difference? All of the animals in this activity are invertebrate animals, that is to say, they do not have backbones.

a

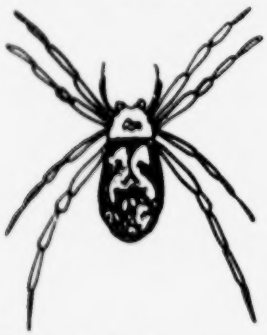
b 

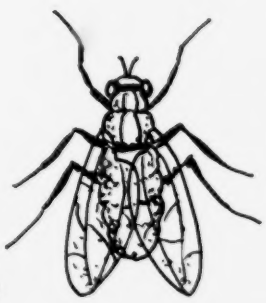
1. Which is the centipede and which is the millipede?

a

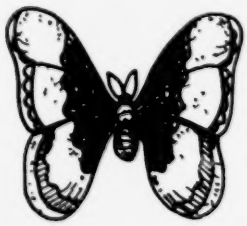
b 

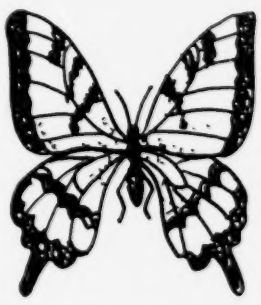
2. Which is the bee and which is the wasp?

a 

b 

3. Which is the insect and which is the spider?

a 

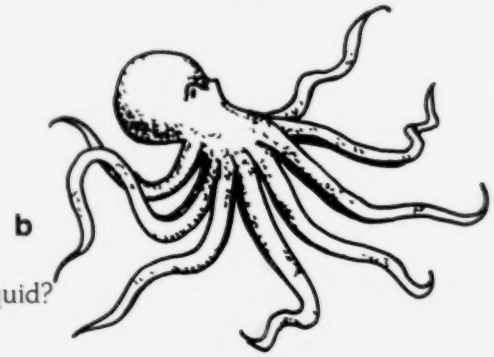
b 

4. Which is the moth and which is the butterfly?

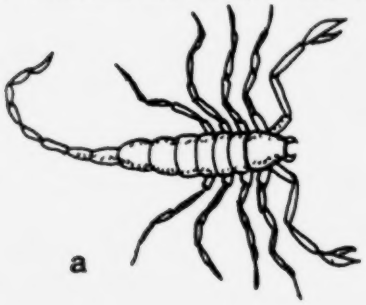
Can You Tell the Difference?

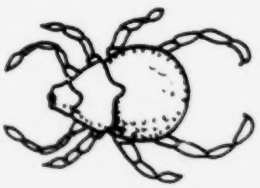
Invertebrate Animals

5. Which is the snail and which is the slug?

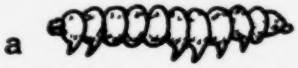


6. Which is the octopus and which is the squid?

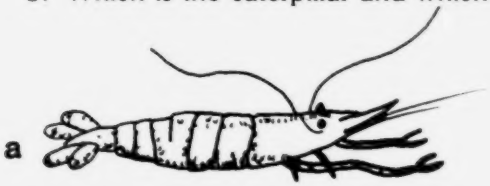


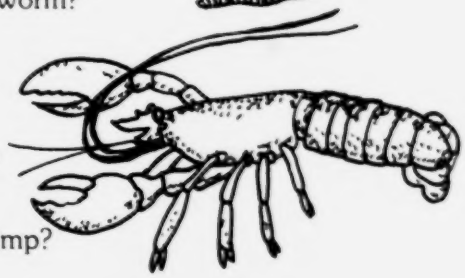


7. Which is the scorpion and which is the tick?



8. Which is the caterpillar and which is the worm?





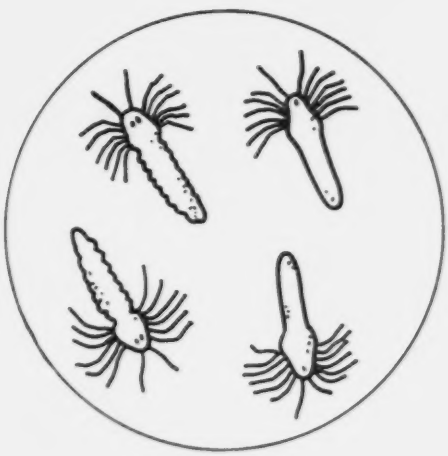
9. Which is the lobster and which is the shrimp?

10. Which is the clam and which is the oyster?

Hatching of Brine Shrimp Eggs

Brine shrimp are found in saltwater lakes. Their dried eggs are readily available from most pet stores where tropical fish are sold. They are easy to hatch and interesting to study. These small crustaceans are characterized by many pairs of swimming limbs and their sensitivity to light.

To study the hatching of brine shrimp eggs and their development into larvae, do the following activity:

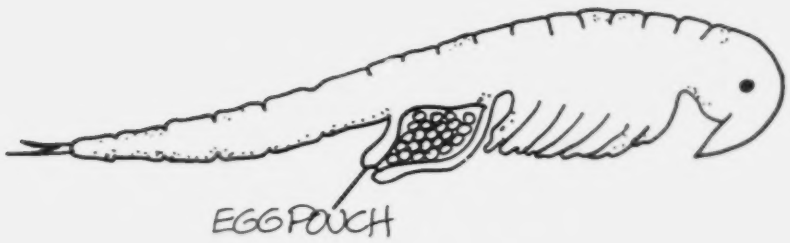


MATERIALS: Brine shrimp eggs, beakers or glass pie plates, rock salt, water, cardboard, eyedropper, glass slides, magnifying glass or microscope

PROCEDURE: *To one quart of water add one and a half tablespoons of rock salt. Allow the salt to dissolve in the water. Sprinkle 1/8 to 1/4 teaspoon of brine shrimp eggs on the surface of the water. Cover ninety percent of the beaker or pie plate with cardboard and keep at about 75° F. The larvae will swim to the light as they hatch. Examine in two or three days. Use an eyedropper for transferring the larvae from the culture to the slide.

*The store where you purchased the brine shrimp eggs may have included instructions for the hatching of the eggs. If so, you may wish to follow those. They may differ slightly, but most instructions for the hatching of brine shrimp eggs will be simple and easy to follow.

Growing Brine Shrimp Larvae



After your brine shrimp have hatched into larvae, you may want to make a culture to grow the larvae into adults. To do this you will need to feed and transfer some larvae as suggested in the activity below.

MATERIALS: Newly hatched brine shrimp larvae, beakers or glass pie plates, rock salt, water, eyedropper, glass slides, yeast, magnifying glass or microscope, wax pencil

PROCEDURE: To one quart of water add one and a half tablespoons of rock salt. Allow the salt to dissolve. Use the eyedropper to transfer a few newly hatched brine shrimp into the fresh brine solution. Use the wax pencil to mark the water line. Feed the brine shrimp a pinch or very small amount of powdered yeast. Do not feed again until the water is perfectly clear; otherwise you will overfeed the culture. As the water evaporates add more FRESH water, not brine solution, to the mark at the water line. It will take about six weeks for the shrimp to mature. Females will be easily identified from the males by their egg pouches. Mature females will lay eggs about every four to five days.

Invertebrate Phyla

Members of the nine phyla or groups of invertebrate animals are pictured below. Make a similar page of your own by substituting a different animal for each phylum. Remember that these are all invertebrates or animals without backbones.

Euglena
Protozoa
(one-celled)

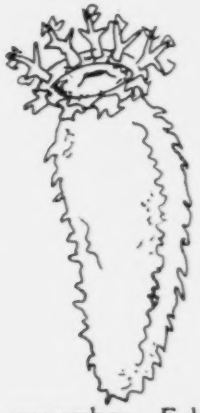
Freshwater sponge
Sponge Group

Hydra
Coelenterate
(sac-like)

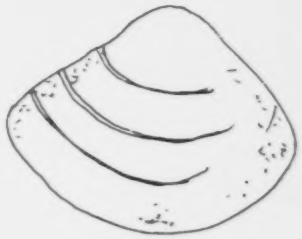
Fluke
Platyhelminth
(flatworm)

Ascaris
Nemathelminth
(roundworm)

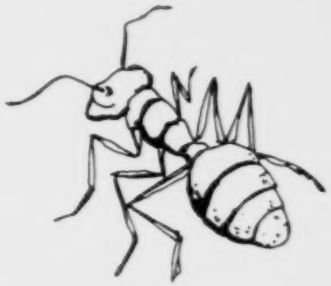
Leech
Annelid
(segmented worm)



Sea cucumber Echinoderm
(spiny-skinned)



Clam
Mollusk
(soft-bodied)

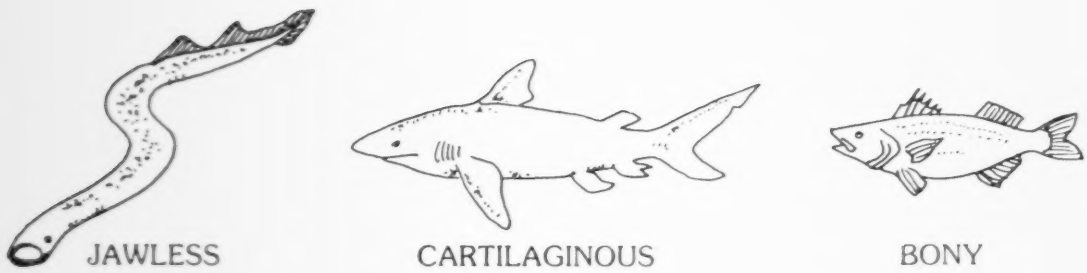


Ant
Arthropod
(jointed-leg)

Fish

Fish are cold-blooded vertebrate animals. This means that the temperature of their bodies varies with their surroundings and that they possess a spinal column of vertebrae. Most fish are covered with scales, breathe with gills and have two eyes, two nostrils and a swim bladder. The sexes of fish are separate, and with some exceptions fish are hatched from eggs.

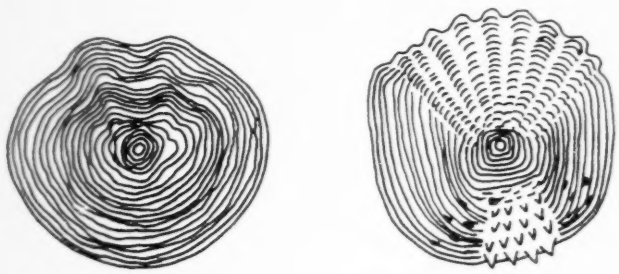
There are three main classes of fish: the jawless fish such as the lamprey eels, the cartilaginous fish such as the sharks and rays, and the bony fish such as the trout and perch.



JAWLESS CARTILAGINOUS BONY

When we think of fish, we usually picture in our minds some type of bony fish. Bony fish vary greatly in structure and include catfish, sea horses, flying fish and perch among many others.

Two of the main types of fish scales found in bony fish are cycloid scales and ctenoid scales.

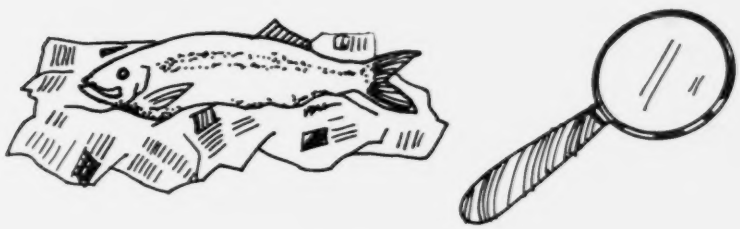


CYCLOID
(pike)

CTENOID
(perch)

Fish Scales

One way to learn more about fish is to study their scales. The layers of growth on a fish scale give clues to its age much the same as the growth rings of a tree. To study the growth rings on fish scales, do the following activity:



MATERIALS: Scales from fresh or preserved fish (several different kinds if possible), microscope or magnifying glass, food colorings (optional)

PROCEDURE: Remove some scales from the head, body and tail regions of the same fish. Put the scales in three different envelopes or dishes. Label the name of the fish and the place on the fish's body where the scales were taken. Do this for each fish. First compare the scales from the three different regions of the same fish and then compare the scales from different kinds of fish.

QUESTIONS:

1. Draw three scales taken from three different parts of the same fish.

2. Why are there differences in the scales?

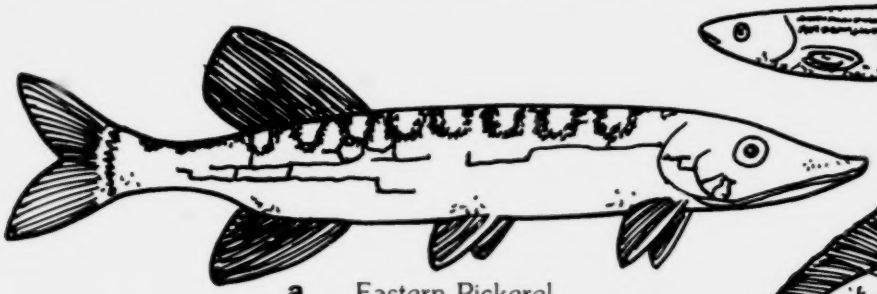
3. Draw and compare the scales taken from the same region of two different kinds of fish.

4. Are any of the scales cycloid or ctenoid? Refer to the preceding page if necessary.

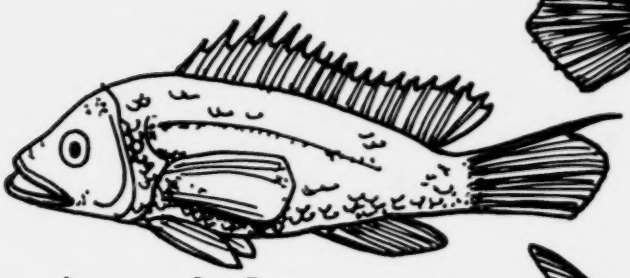
5. Put drops of different food colors on the fish scales and examine under a microscope to see a beautiful nature pattern.

Fresh and Saltwater Fish

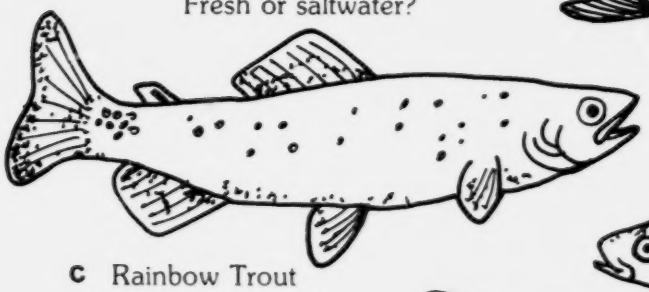
With a few exceptions, most fish live in either fresh or salt water. Salmon and eels are two examples of fish that live part of their lives in both environments, but they are the exceptions rather than the rule. Below are some examples of both fresh and saltwater fish. Indicate by circling the appropriate word to show if the fish makes its home in fresh or salt water.



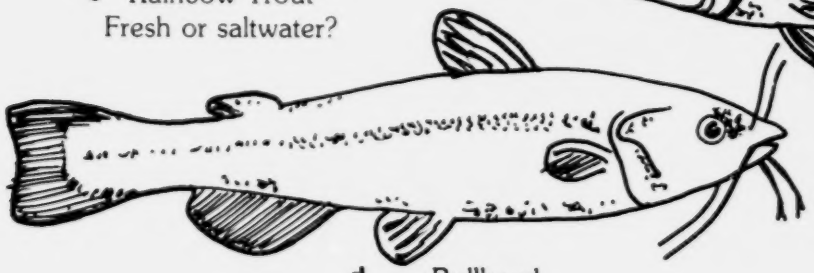
a Eastern Pickerel
Fresh or saltwater?



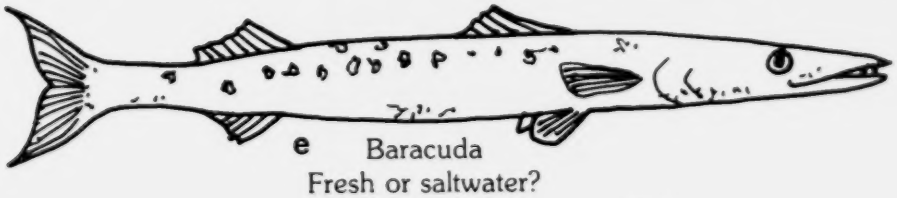
b Sea Bass
Fresh or saltwater?



c Rainbow Trout
Fresh or saltwater?



d Bullhead
Fresh or saltwater?

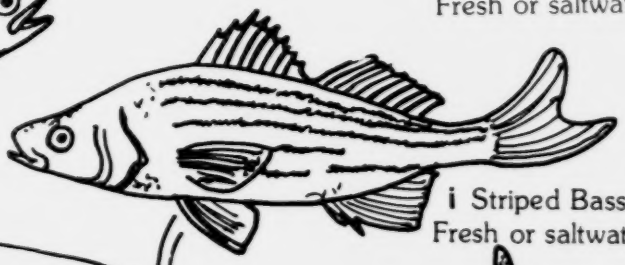


e Baracuda
Fresh or saltwater?

f Smelt
Fresh or saltwater?

g Flounder
Fresh or saltwater?

h Mackerel
Fresh or saltwater?



i Striped Bass
Fresh or saltwater?

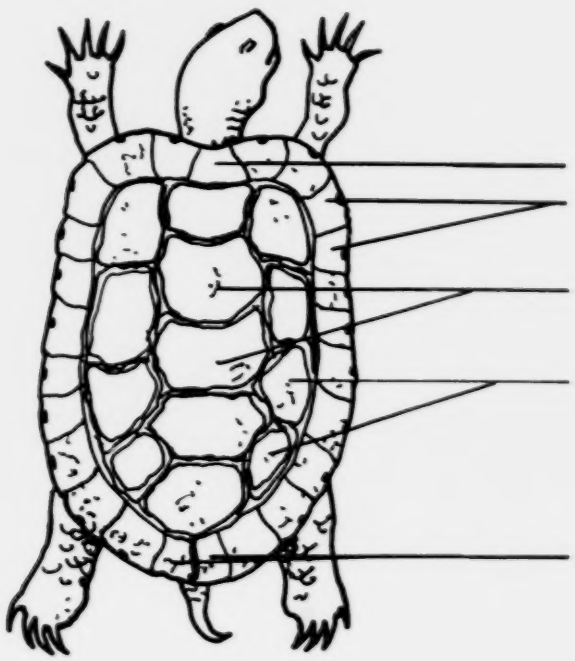
j Sea Bass
Fresh or saltwater?

32

A Tortoise's Shell

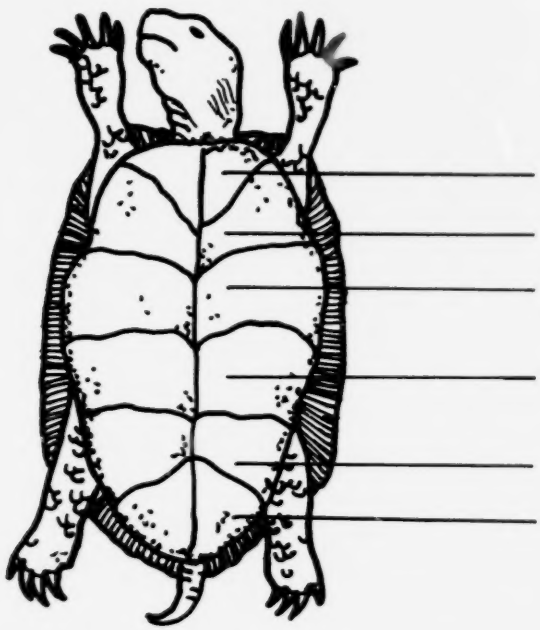
The shell of a tortoise is a mixed blessing. The entire body of a tortoise may be enclosed within the shell for protection, but the shell also makes the tortoise a very slow animal as it makes up about 40 percent of its total body weight. The shell of a tortoise is an outgrowth of its backbone. The upper or curved part of the shell is called the carapace; the flat or bottom half is called the plastron. Shells of tortoises are made of many bones covered by large scaly shields. The pattern of these shields is the way these animals are identified. If you follow the directions below, you will learn a lot about the identification and classification of a tortoise.

If you have the empty shell of a tortoise or turtle, place the shell with the curved side on top and the head end of the tortoise's shell facing opposite you, or simply look at the drawing below. Find the single shield just below the neck. Label this shield the precentral. At the opposite end of the carapace just above the tail are two small shields which are sometimes fused. Label these shields the postcentrals. All the other shields along the outside edge are called marginals; label them. The five large shields going down the middle of the back are to be labeled centrals. The four shields on both sides of the centrals are called lateral shields. Label them, also. Review what you have just learned.



A Tortoise's Shell

The twelve shields on the bottom or plastron side of a tortoise are arranged in six more or less matching pairs. The two top triangular-shaped shields just below the neck are called the gular. The next pair are the humeral; they are followed by the pectorals, the abdominals, the femorals and lastly the two anal shields which are located just above the tail. Label these shields on your drawing and review them.



QUESTIONS:

1. If you have a live or preserved tortoise or turtle to study, notice the jaws and feet. Describe them.

2. What one word best describes the skin of a turtle or tortoise?

3. Are tortoises warm or cold-blooded animals?

4. To which class of vertebrates do tortoises belong?

5. The words *turtle*, *tortoise* and *terrapin* are sometimes used interchangeably, although technically they have different meanings. If you do not know the difference between these terms, look them up in a dictionary or encyclopedia.

Animal Groups

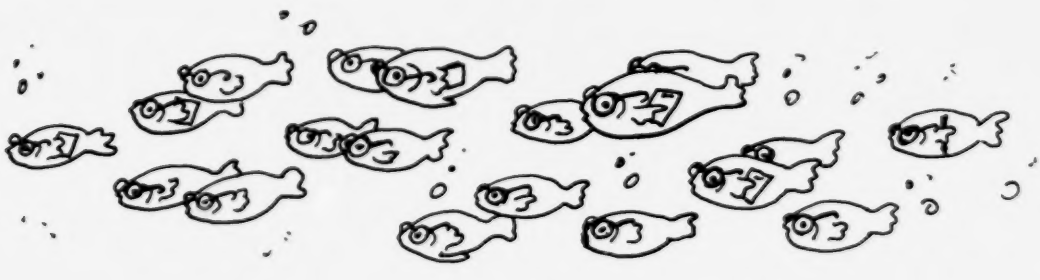
Groups of animals have special names. Although these names are not frequently heard, their usage denotes a precise use of language. A group of elephants, you may already know, is referred to as a herd; but do you know that the term for a group of geese is "a gaggle of geese"? To test your expertise in the words for animal groups, match the phrases at the bottom of the page to the terms above them. Use a dictionary if you need help.

Terms

Swarm, flock, litter, horde, school, brood, band, skulk, team, murder, muster, pride, clowder, yoke, rafter, brace, exaltation, span, drove, troop.

Phrases

1. a _____ of gorillas.
2. a _____ of crows.
3. a _____ of turkeys.
4. a _____ of bees.
5. a _____ of sheep.
6. a _____ of pigs.
7. a _____ of peacocks.
8. a _____ of gnats.
9. a _____ of ducks.
10. a _____ of larks.
11. a _____ of fish.
12. a _____ of mules.
13. a _____ of horses.
14. a _____ of foxes.
15. a _____ of kangaroos.
16. a _____ of oxen.
17. a _____ of cattle.
18. a _____ of chicks.
19. a _____ of cats.
20. a _____ of lions.



Poisonous Snakes of the United States

In the United States there are only four kinds of poisonous snakes: the rattlesnake, the copperhead, the cottonmouth or water moccasin and the coral snake. There are, however, many different kinds of rattlesnakes, making their identification confusing. The same snake may also have different color phases which add to the confusion. The diamondback rattler is more easily identified by its diamond-shaped pattern and a black eye mask. The timber rattler has a zigzag pattern on its back.

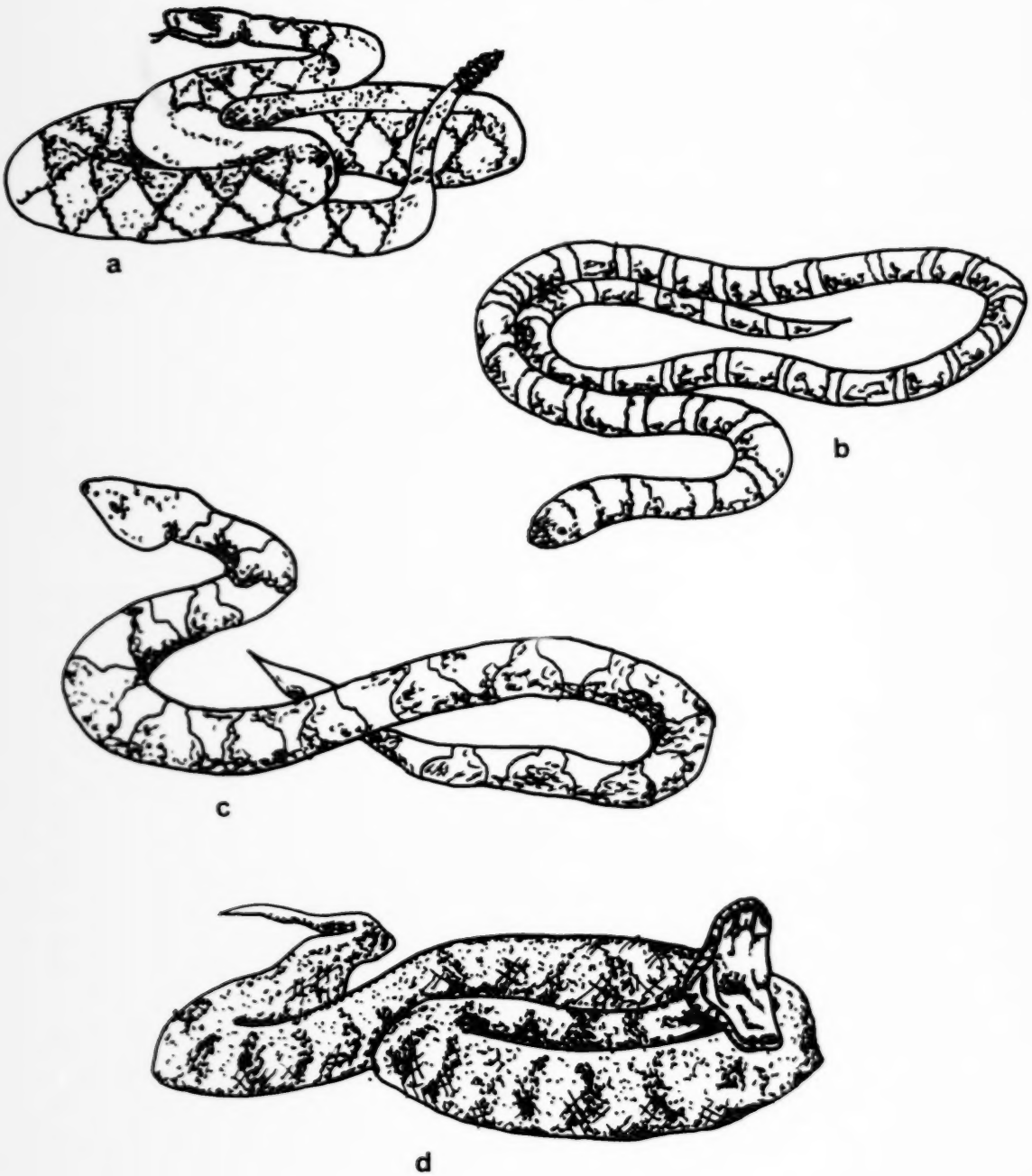
The hourglass design on its back when viewed from above makes the copperhead easier to identify than the rattler; but it too has different color phases, and one copperhead can look different than another one of the same species.

The cottonmouth, or water moccasin as it is sometimes called, looks black or greenish black with faint markings similar to a copperhead. It has a white chin and chunky head. The cottonmouth has a habit of turning its head and opening its mouth to reveal a white lining of the mouth and throat.

The rattlesnake, copperhead and cottonmouth are all closely related snakes. They are all pit vipers; that is to say, they have a sensory pit between their eyes and nostrils. This pit is highly sensitive to the heat given off by warm-blooded animals. Pit vipers do not need to see a warm-blooded animal before striking. They can sense its location by means of this special sense. The poison of all three of these snakes is called a hemotoxin. Hemotoxins affect the blood by destroying red blood cells.

Coral snakes are found in a limited area of the United States, mostly in Florida and parts of Georgia. They are shy snakes and live most of the time underground or under leaves and other ground cover. They are very easy to identify because they are small, have round pupils and are brightly colored with bands of bright yellow, red and black. Their snouts are black. Coral snakes are highly poisonous. Their venom is similar to that of a cobra's. The venom is called a neurotoxin by scientists because it quickly affects the nervous system.

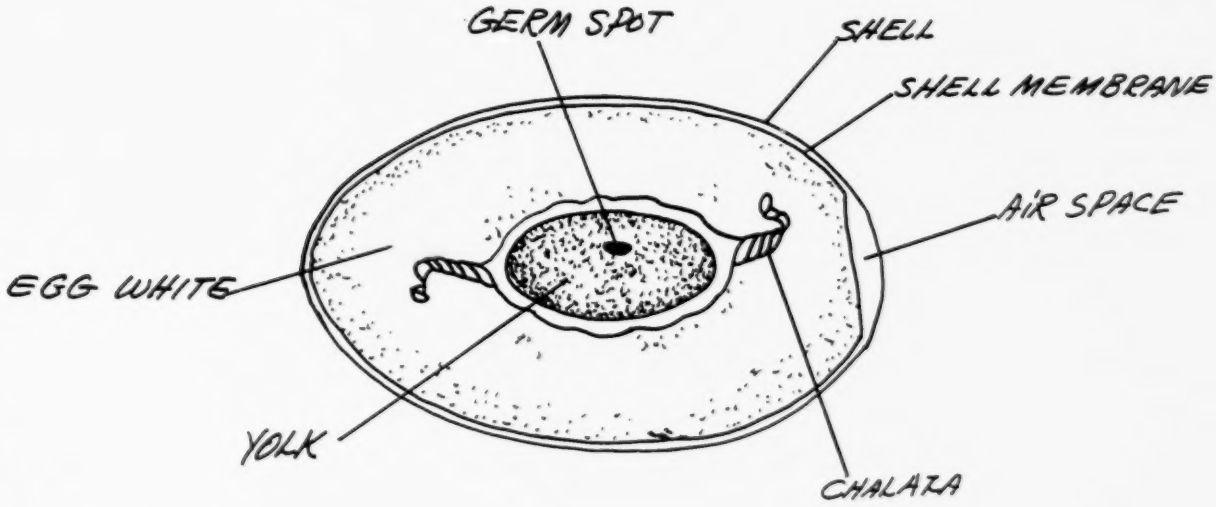
Poisonous Snakes of the United States



Identify the poisonous snakes above. Use the hints on the previous page or an encyclopedia for information to color them.

Eggs

When you think of the word *egg*, your mind probably pictures one or two chicken eggs served in some appetizing manner for breakfast, but have you ever thought about what eggs really are and how important they are to the survival of many animals? Most animals with the exception of the majority of mammals are hatched from some type of egg. Mammals along with some scattered species of other animals are born alive. To learn about eggs, match the parts of the chicken egg below to the descriptions at the bottom of the page.



1. _____ is the small spot on the yolk where the chick first begins to develop.

2. _____ are the twisted cords which hold the yolk and center it in the egg.

3. _____ is located just inside the shell. When the egg is fertilized, this part helps the developing chick to breathe.

4. _____ This part of the egg is often called the albumin. It is a good source of protein and turns white when cooked.

5. _____ provides nourishment for the chick. It is usually called the yellow part of the egg.

6. _____ separates the white of the egg from the shell.

7. _____ is the hard protective covering of the egg.

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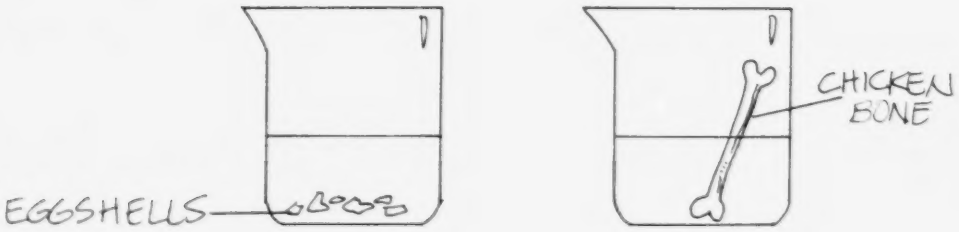
What Do Bones and Eggshells Have in Common?

Calcium is a mineral which makes bone tissue hard and gives it strength. It is the same mineral that gives strength to an eggshell. Most of the calcium in your body comes from drinking milk or eating milk products such as cheese or ice cream. Chickens get the extra calcium needed for their bones and eggshells from small pieces of limestone in their feed. To compare the effect of an acid on the calcium in eggshells and bones, try this experiment.



MATERIALS: Eggshells, long thin chicken bones, vinegar or dilute hydrochloric acid, two jars or beakers

PROCEDURE: Soak some eggshells in one beaker of vinegar or dilute hydrochloric acid and one or two long thin chicken bones in another. Examine daily.

MATERIALS	RESULTS		
	DAY 1	DAY 2	DAY 3
Eggshells			
Chicken bones			

QUESTIONS:

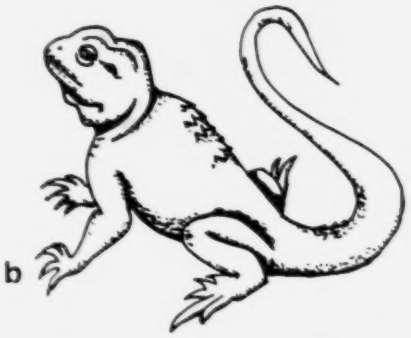
1. Where do you think baby chicks developing inside eggshells get the calcium they need to make their skeletons?

2. Why is it easy for a baby chick when it is ready to be hatched to break out of an eggshell?

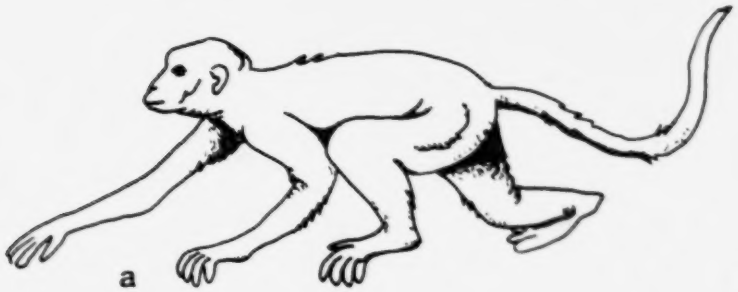
FOR THE SUPER SCIENTIST: Put a few drops of dilute hydrochloric acid on a piece of limestone. Describe what happens. Why?

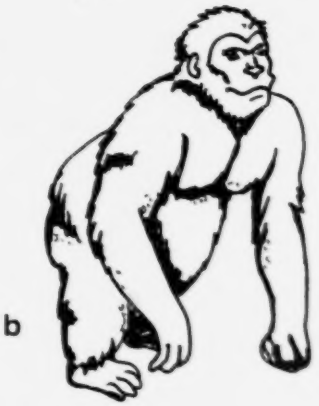
Can You Tell the Difference?
Vertebrate Animals

All of the animals pictured below are vertebrate animals; that is to say, they all have backbones. The two animals in each pair are often mistaken for one another. Can you tell which is which and explain their differences?

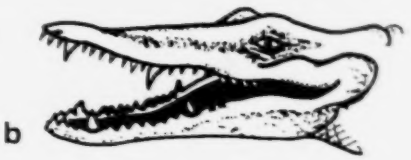


1. Which is a salamander and which is the lizard?

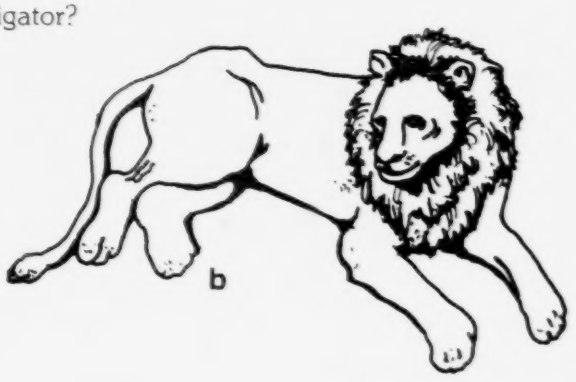




2. Which is the monkey and which is the gorilla?



3. Which is the crocodile and which is the alligator?

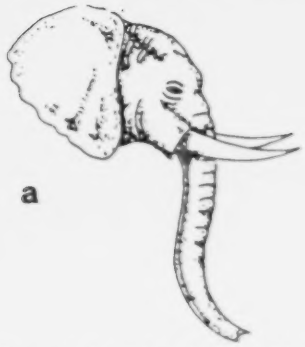


4. Which is the lion and which is the tiger?

40

Can You Tell the Difference?

Vertebrate Animals



a

b

5. Which is the Indian and which is the African elephant?

a

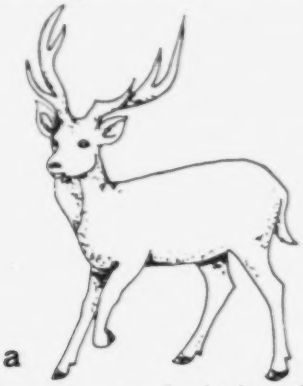
b

6. Which is the walrus and which is the seal?

a

b

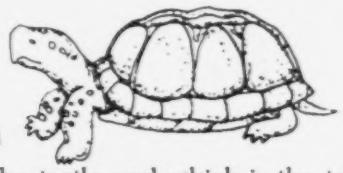
7. Which is the frog and which is the toad?



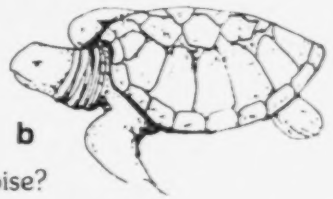
a

b

8. Which is the moose and which is the deer?



a



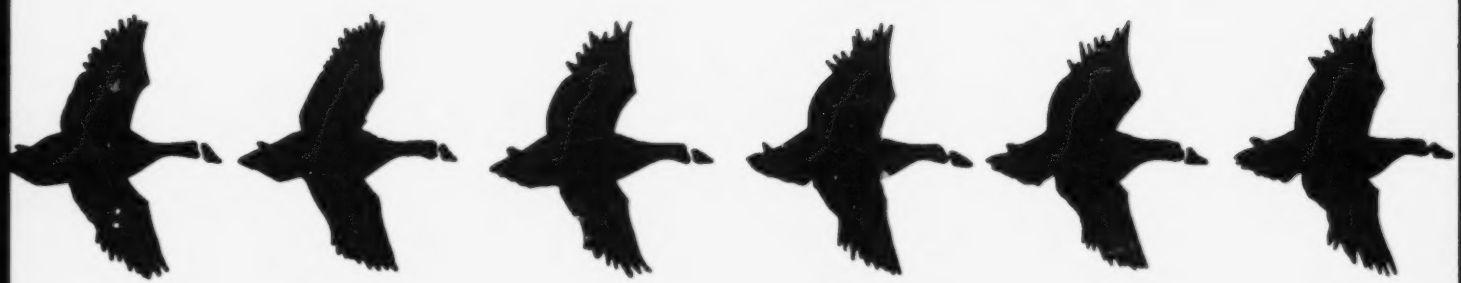
b

9. Which is the turtle and which is the tortoise?

Proper Terms for Young Animals

Everyone knows that a young rabbit is called a bunny, but the proper terms for the young of many other animals are not as widely known. See how many of the correct names for the young of animals on the right you can match to the more familiar names of the adult animals on the left. Use connecting lines. A dictionary may prove helpful.

1. Pigeon	a. Kit
2. Cow	b. Shoat
3. Hen	c. Cygnet
4. Horse	d. Kid
5. Lion	e. Calf
6. Swan	f. Colt
7. Eel	g. Squab
8. Kangaroo	h. Joey
9. Pig	i. Elver
10. Goat	j. Cub
11. Fish	k. Fry
12. Fox	l. Pullet



Birds

To many people, birds are the most colorful and beautiful of all vertebrate animals. Their striking coloration is due to special pigments in their feathers. Feathers are found only on birds and are outgrowths of the skin much like the scales of fish or the hair on mammals. The two main types of feathers are contour and down feathers.

CONTOUR FEATHER

DOWN FEATHER

Contour feathers cover most of the outside of a bird's body and help to give it its shape. Down feathers are soft and fluffy. They are found underneath the contour feathers of adult birds and are the first feathers of newly hatched birds.

In addition to feathers, birds have efficient four-chambered hearts and lightweight skeletons of bone. They lack teeth but possess bills which differ in size and shape according to the needs of the particular bird. Birds are warm-blooded with some species reaching body temperatures of up to 112°F.

Birds have well-developed senses of sight, hearing and balance. Their unusually large eyes provide the best vision of all animals. Because their eyes are usually set on the sides of their heads, the bones in their necks are extremely flexible to enable them to turn to see in all directions.

FOR THE SUPER SCIENTIST:

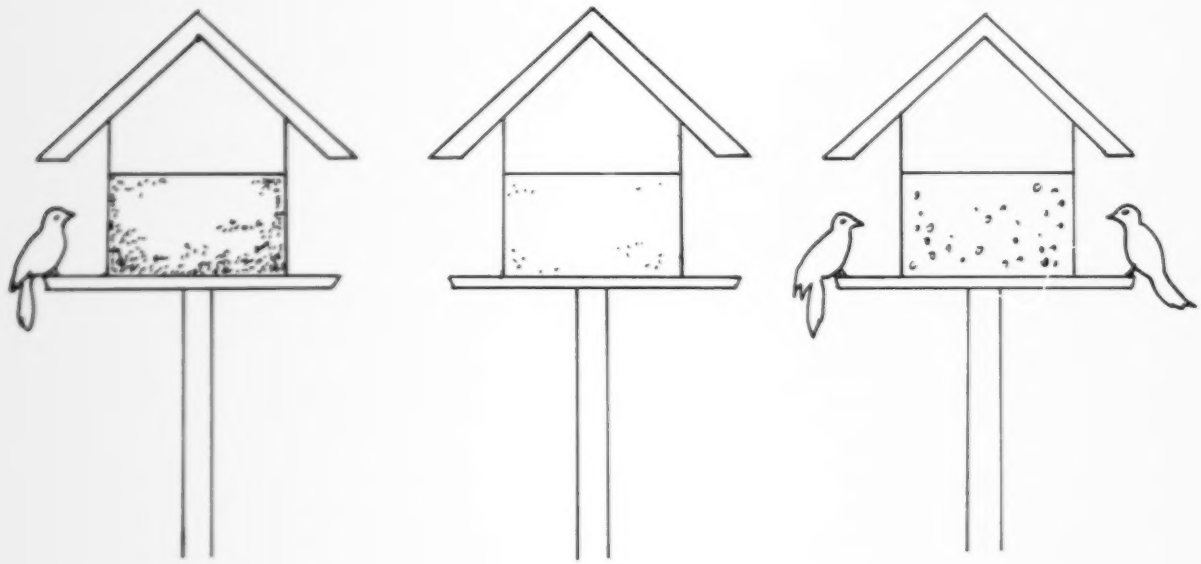
1. Make a recording of a bird's song. Songs are usually made by male birds during the breeding season.

2. Make a recording of bird notes. Notes are the "conversation" of birds. Notes may signal a warning, a gathering or state a territory.

3. Collect some bird feathers to study under a microscope. Birds molt (shed feathers) in the late summer and spring.

What Color Food Do Birds Prefer?

Most mammals do not see in color, and in many mammals the sense of sight is inferior to the sense of hearing or smell. Birds, however, are famous for their eyesight, and most birds have color vision. To find which color birds prefer in their choice of food, do the following experiment which your class may want to set up outside your science window.



MATERIALS: Three bird feeders, birdseed, food colorings—red and green or colors of your choice, three jars with caps, notebook and pencil

PROCEDURE: Pour equal amounts of birdseed into the three jars. One jar will be your control, and you will not add food coloring to it. Color the other two jars of birdseed by adding a different food color to each jar. Mix the food coloring by capping the jars and shaking. On one bird feeder, put the natural bird food. Use a different color birdseed on each of the other two feeders. Keep track of the amount of food eaten at each feeder. Repeat the experiment to check your data.

QUESTIONS:

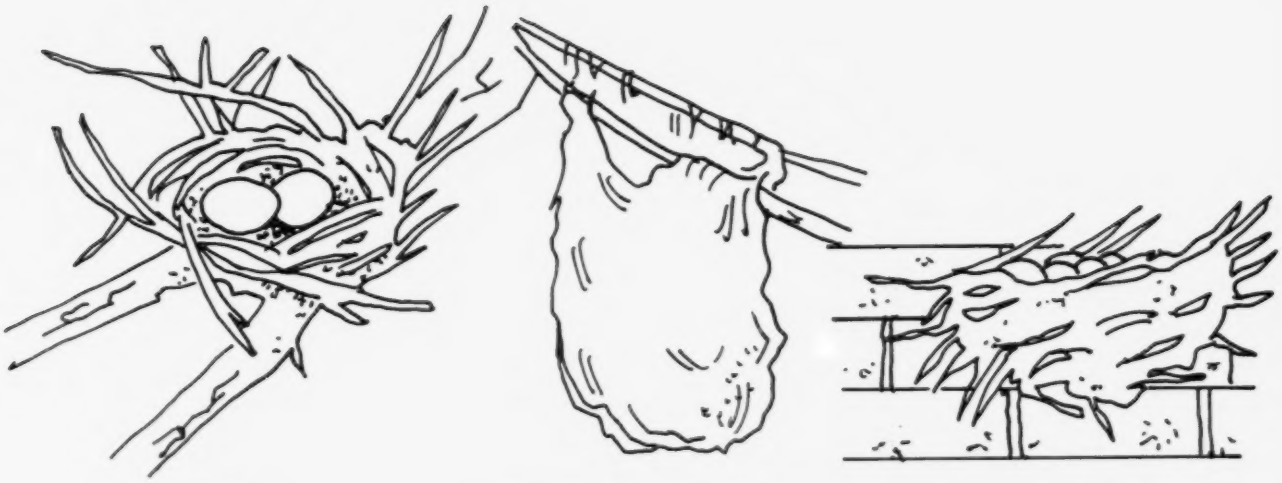
1. Which color birdseed did the birds prefer?

2. Which color did they like least?

3. Can you explain why birds preferred one color to another?

Build a Better Nest

Below are three examples of the variety of ways in which birds build their nests. To better appreciate "bird architecture," try your hand at building a bird's nest.



Mourning Dove | Baltimore Oriole | Chimney Swift

MATERIALS: Pine needles, string, mud, straw, dried grass, twigs, bark, etc.

PROCEDURE: Use your creativity to build a bird's nest.

VARIATION: Have a contest to see who can build the best nest.

FOR THE SUPER SCIENTIST: Learn to identify a variety of different types of nests in your community.

A Seasonal Bird Tree

MATERIALS: Tree branch or small tree, sand bucket or large container, stiff paper, magic markers or crayons, paper clips, scissors, bird books

PROCEDURE: Select a well-formed tree branch or use a small potted tree. If you use a branch, set it in a large container of sand. Use pictures of local birds from bird books as guides for your drawings. Be sure to color the birds as natural as possible. After you have cut them out, use paper clips for attaching them to the limbs of your tree. Change the bird tree to fit the birds of your locality for each season of the year.

Beaks and Feet of Birds

The beak of a bird tells what kind of food that particular type of bird eats; the feet of a bird indicate where it seeks its food and tell whether or not its feet are used in seizing prey. Below on the left are the heads of five birds. Their feet are on the right. Match the heads to the feet by drawing connecting lines.

1

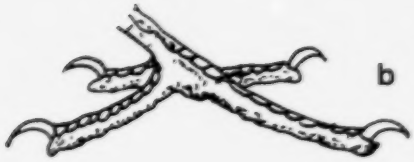
2

3

4

5

a



b

c

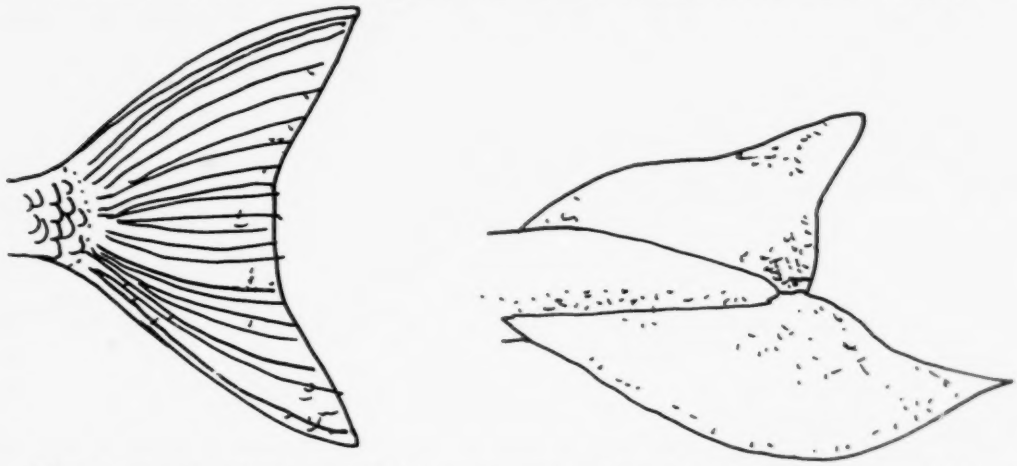
d

e

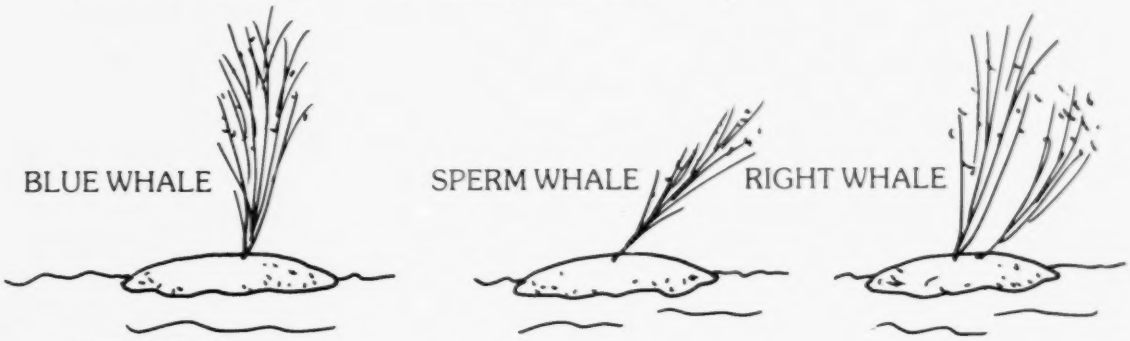
The Largest Animals That Ever Lived

The largest animals that ever lived are whales, the blue whales to be exact. Some blue whales have weighed as much as 150 tons or over 300,000 pounds! The heart alone of a blue whale weighs over 1,000 pounds. Scientists tell us that the reason whales can grow as large as they do is because they live in water. The fact that the water is denser than air helps to support the whale's enormous bulk. Some people think that whales are fish. They are not. Whales are warm-blooded animals and as such are classified as mammals, the same as man. Whales breathe with lungs and give birth to living young which are fed milk by their mothers. They also have a sparse amount of hair on their bodies.

The tail of a whale is very different from that of a fish, as you can see in the diagram below. It is adapted for bringing the whale to the surface of the water quickly.



Most people are familiar with the expression, "Thar she blows." Whalers once used this expression to signify the sighting of a whale. In most cases the spouting of a whale is caused by a mixture of seawater and the exhaled air from the lungs of a whale. Experienced whalers can often identify a whale by its spout.



QUESTIONS:

1. Why do whales need tails that are adapted for quick surfacing while fish do not?

2. Which whale in the drawing above has two blowholes, a right whale or a blue whale?

3. List the main differences between whales and fish.

Whale Identification

Use the descriptions of these well-known kinds of whales to identify their pictures on the next page.

1. A humpback whale has a thick body, rows of baleen in place of teeth, a pleated throat and large, long flippers. It is known for its ability to jump out of the water. This is called breaching. A humpback whale has bumps on its head and jaws and can grow to about 48 feet.

2. A blue whale is the largest creature on earth. It is a baleen whale with a pleated throat, bluish back and light-spotted belly. A blue whale can grow to 90 feet and beyond.

3. A killer whale is considered by some to be more dangerous than a shark. It can be found in all the oceans but prefers the cold polar waters. A killer whale hunts its prey and eats other whales, large fish including sharks, seals, porpoises and sea otters among other animals. You can identify a killer whale by its white underside, a white spot over each eye and its teeth. It grows to about 30 feet.

4. A narwhal lives only in the Arctic seas. It is still used for food by Eskimos. It is a toothed whale with one enlarged tooth or tusk of ivory. A narwhal grows to about 14 feet.

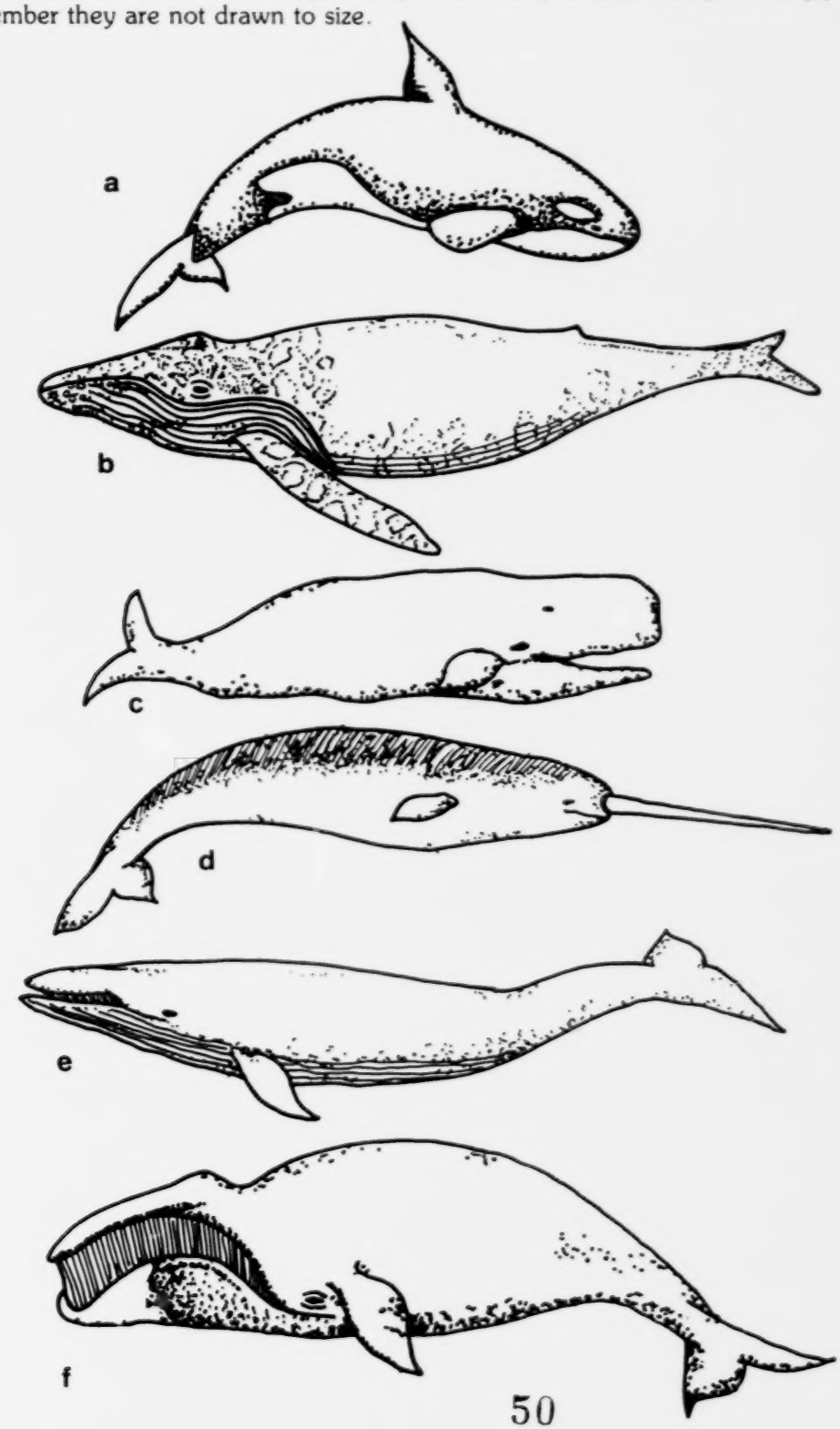
5. A sperm whale has a very large head and a lower jaw lined with teeth. It is noted for its ability to make deep dives into ocean depths in search of giant squids, a favorite food. Herman Melville, in his book, *Moby Dick*, wrote about a white sperm whale. A sperm whale can grow to 50 feet.

6. A bowhead whale has a large head and a white front chin. It was named for its mouth which is shaped like a bow. It can grow to 57 feet.

FOR THE SUPER SCIENTIST: Use the information above to make a bar graph of the sizes of whales.

Whale Identification

Identify the whales on this page, using their descriptions on the preceding page. Remember they are not drawn to size.

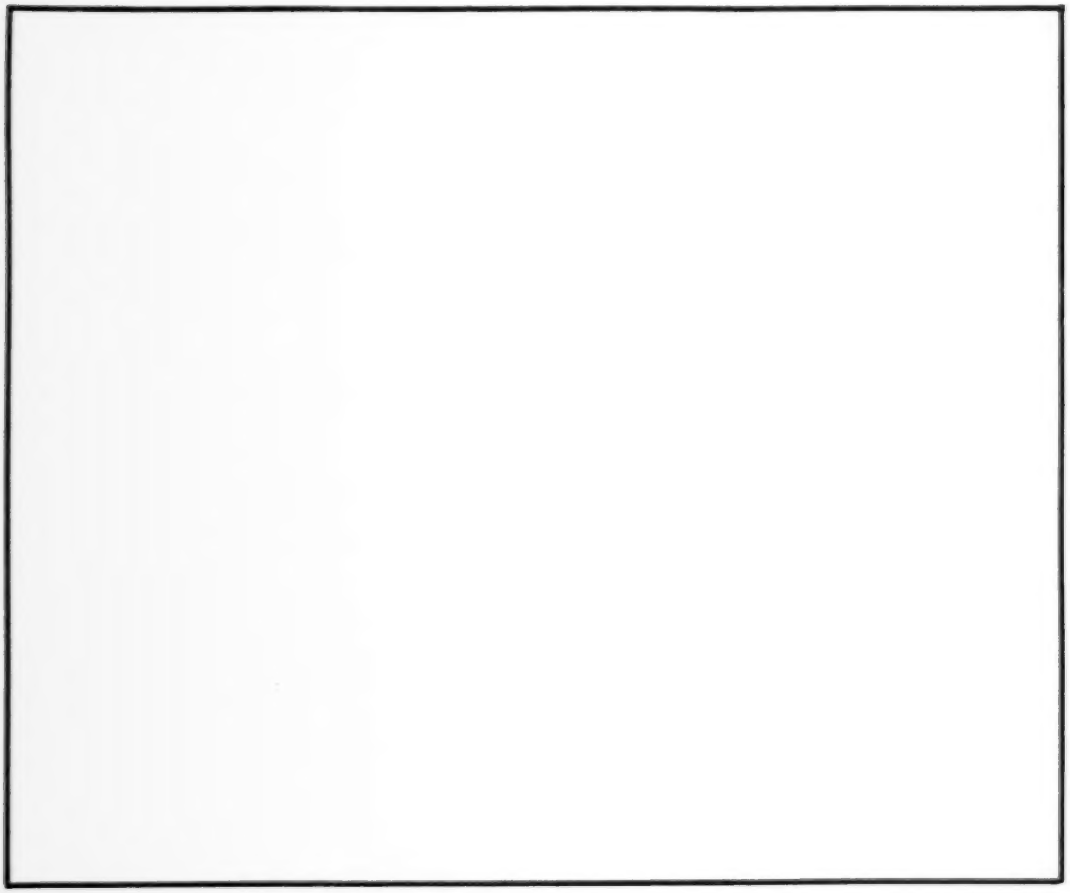


50

Animal Composite

In the space below, draw a mammal using the parts of various mammals given in the instructions below.

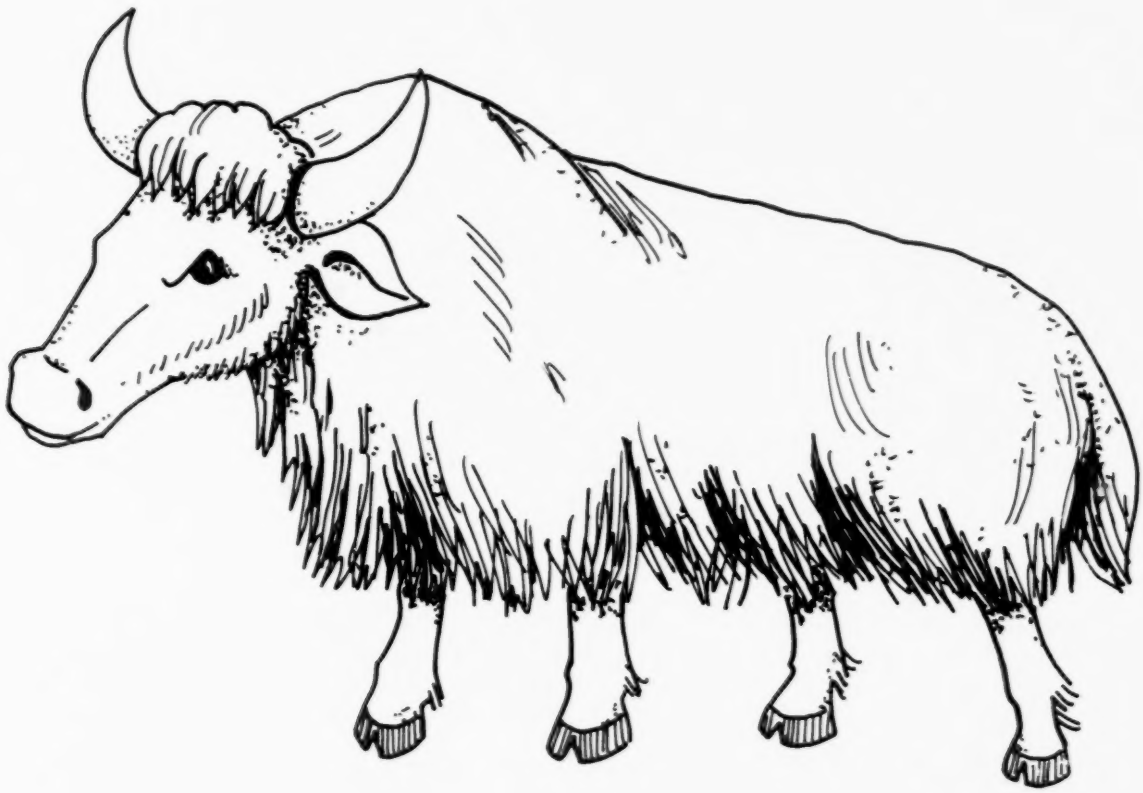
1. Draw the head of a cow, but give this animal large horns like those of an ox.
2. Add to the head the body of a bison (American buffalo).
3. Attach to the body the tail of a horse.
4. Make the hair on the body shaggy, like that of a goat.
5. This animal walks on four feet like those of a cow. Draw them.



6. Does such an animal really exist? Yes. To see one, turn to the next page.

Animal Composite

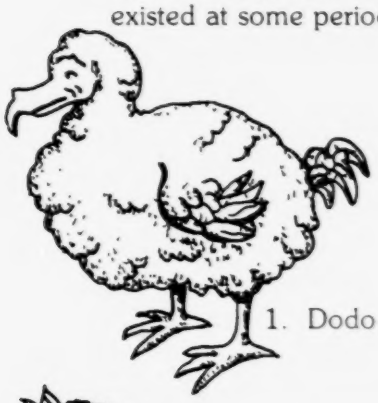
The animal described on the preceding page is called a yak. The yak is found in Tibet and the neighboring high mountainous regions of Asia. It is a very useful animal since it serves as a beast of burden, its long hair can be made into rope or cloth, and it provides a high quality of milk and meat.



Create an "animal" of your own design. If you wish, you can use parts from birds, reptiles, fish, etc., to create your animal. Be sure your animal's parts will serve a useful purpose to that animal or to man as the yak's various parts make it a very valuable creature.

Real or Imaginary?

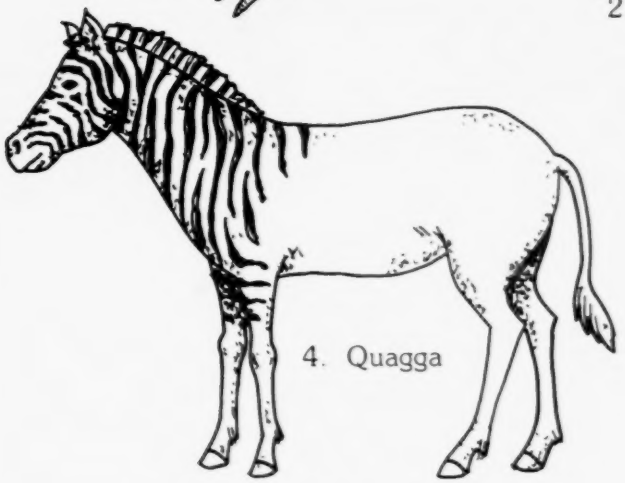
In some corners of the earth, there exist strange-looking animals. Can you tell which, if any, of the animals below are purely imaginary and which do exist or have existed at some period of time?



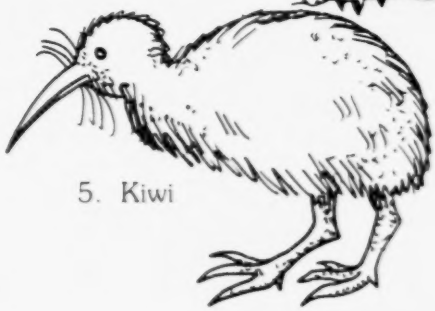
1. Dodo

2. Fennec

3. Tarsier



4. Quagga

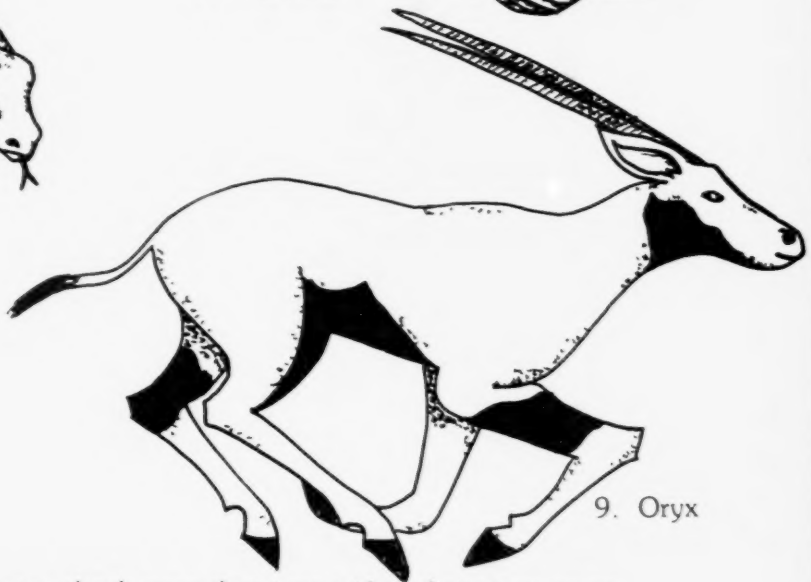


5. Kiwi

7. Narwhal

6. Komodo Dragon

8. Viscacha



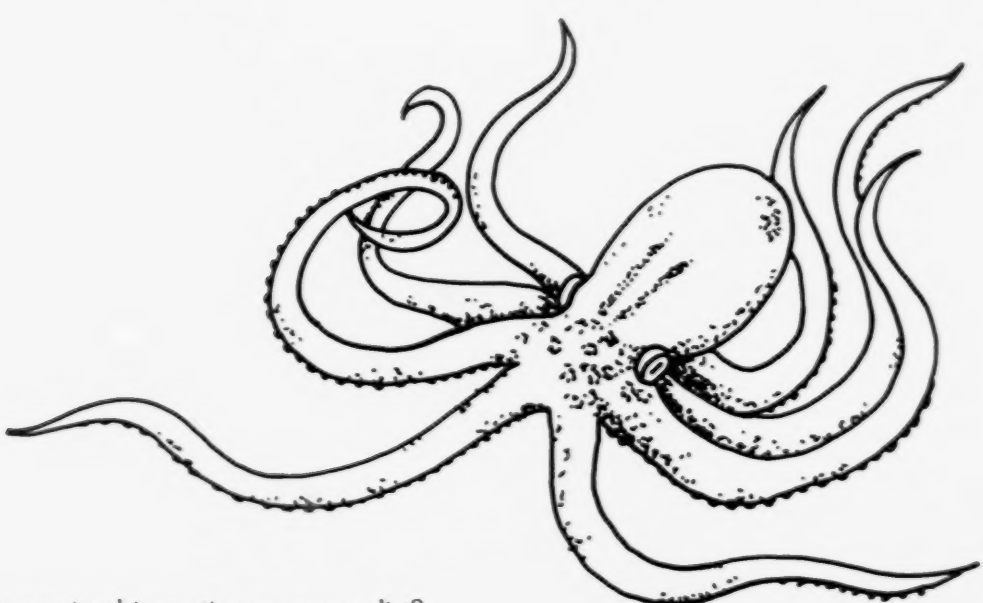
9. Oryx

If you are unsure of your answers, check your decisions with a dictionary or encyclopedia.

Animal Inventions

Some animals have been using inventive ways of doing things long before man. These "inventions" make the study of animals both useful and interesting. By making connecting lines, try to match all the inventions on the left to the animals on the right which naturally use them.

1. Sonar	a. Beavers
2. Injections	b. Wasps
3. Jet propulsion	c. Eels
4. Bridge building	d. Octopi
5. Paper manufacturing	e. Ants
6. Camouflage	f. Birds
7. Dam construction	g. Chameleon
8. Electricity	h. Mosquitoes
9. Weaving	i. Spiders
10. Spinning silk	j. Bats

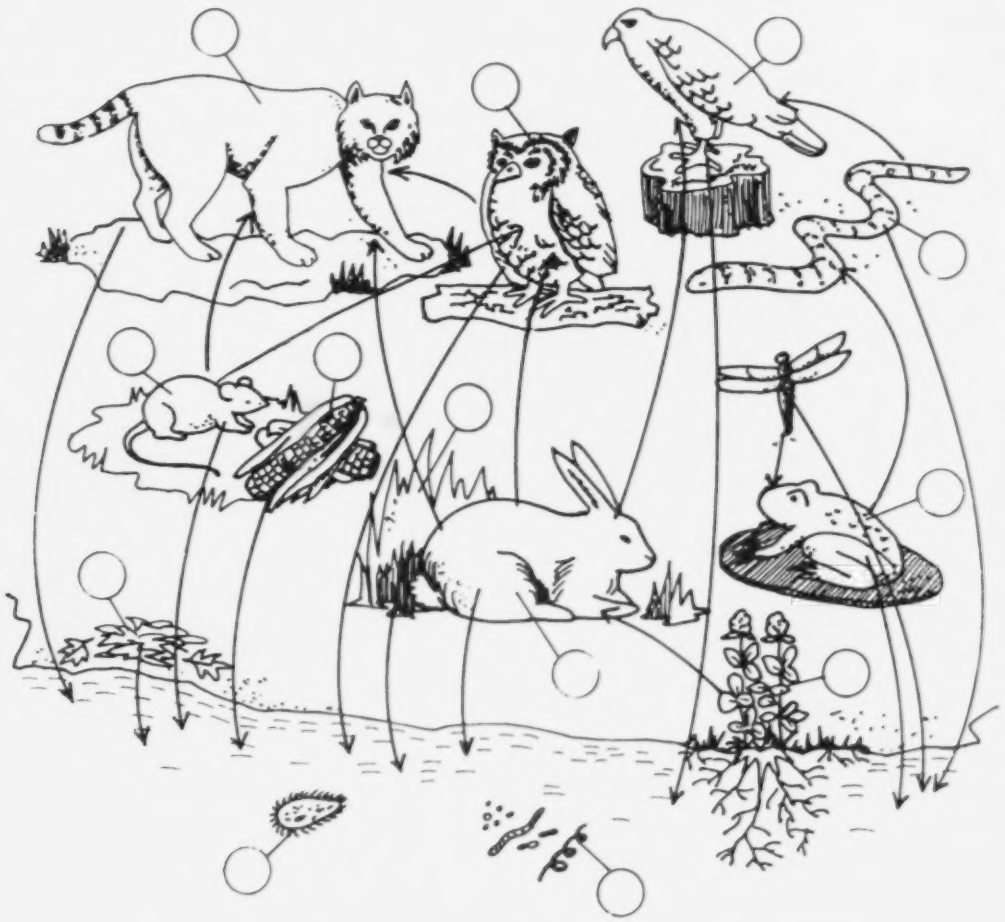


What other animal inventions can you list?

54

A Biological Community

No one organism can exist by itself; all living things in one way or another depend on each other for food. The living things or organisms which live together in a particular place are referred to as a biological community—a desert, lake, pond, field or sea can be a biological community. As one organism eats another, energy is transferred. The passing of energy can be illustrated in the food web below.



In the above drawing of a food web, put the number of the member of the community described below in the circle on the drawing which it represents.

1. Producer—only green plants can be considered producers because only they have the ability to make food

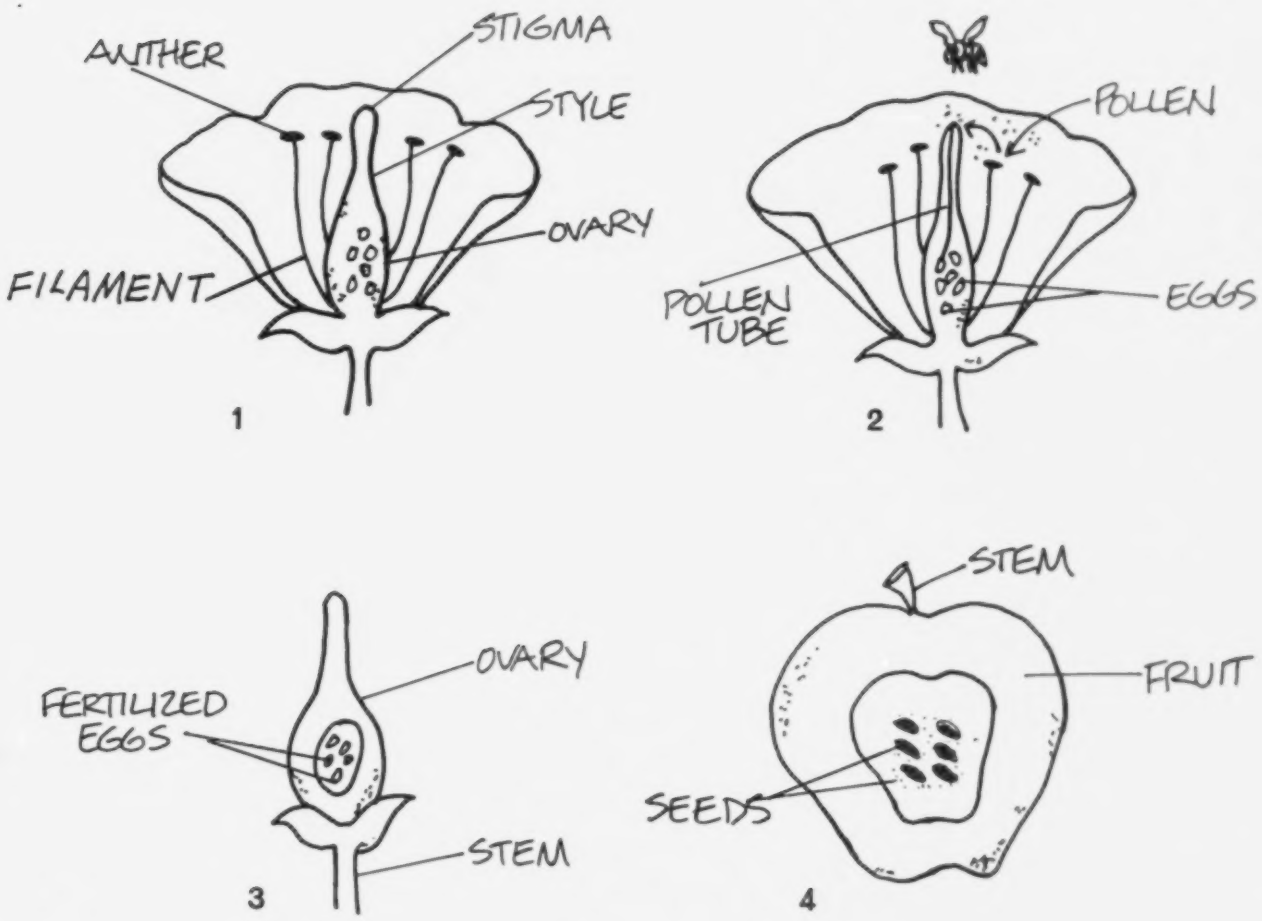
2. First level consumer—a living thing that feeds directly on green plants

3. Second level consumer—a living thing that eats mostly first level consumers

4. Third level consumer—a living thing that eats mostly second level consumers

5. Decomposer—an organism that breaks down the remains of dead plants and animals, releasing energy that can be recycled into the food web

From Flower to Fruit: The Story of an Apple



1. A perfect flower such as an apple blossom has both male and female parts. The male parts are called stamens. A stamen is composed of an anther and a filament. The anther produces pollen for the plant. The female part of an apple blossom is called the pistil. The parts of a pistil are the stigma, style and the ovary. The ovary produces eggs.

2. If pollen from the anther is carried to the stigma, it makes a special tube to reach the eggs in the ovary. When the pollen grains meet the eggs, fertilization takes place. This means that the eggs can develop into seeds.

3. The petals, whose job it was to attract insects to carry pollen from the anther to the stigma, are no longer needed. They will drop off the flower, and the ovary will begin to grow.

4. When the seeds are fully developed, the ovary stops growing and the fruit is considered to be ripe. If it is not picked, it will fall to the ground to be eaten by animals.

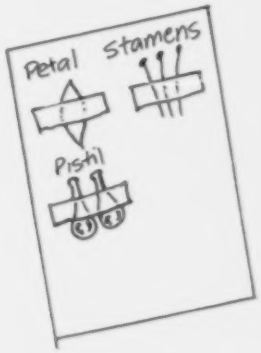
Preserving the Parts of a Flower

MATERIALS: Fresh flowers such as apple blossoms, azaleas, etc., tweezers, scalpel or razor blade, construction paper, Scotch tape or glue, Con-Tact paper, pencil or pen, old magazines

PROCEDURE:

1. Carefully take your flower apart. Learn the name of each part as you dissect your flower.

2. Glue or tape each part of the flower onto a piece of construction paper. If the ovary is too thick, use the razor blade or scalpel to make a thin slice for better mounting.



3. Label the parts.

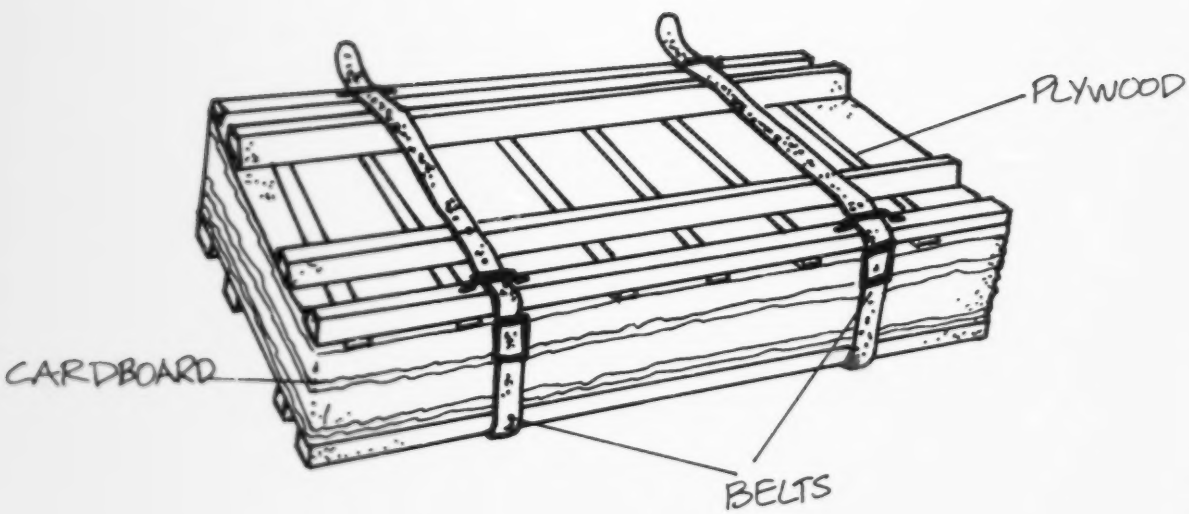
4. If you used glue, wait until it has dried then place the mounted flower parts between the pages of an old magazine. Place a weight on top and allow to dry.

5. Cover with Con-Tact paper or laminate.

You can mount an entire flower by following the same steps. Be sure to select only thin delicate flowers as thick ones do not work as well. Try making a collection of common wild flowers in your area for class study and identification. Wild flowers mounted and framed make nice gifts. Do not laminate the flowers if you put them in a frame.

Make a Botanical Collection

You can easily make a nice collection of mosses, ferns, leaves and flowers of your community that you can enjoy and keep for a long time. Begin by collecting leaves, flowers, ferns, etc. You will need to press them and allow them to dry. You can do this by putting them between the pages of a magazine and placing a weight on them or you can make a simple plant press. A simple plant press can be made from layers of cardboard and some old belts. Layer your specimens between the cardboard. Cover the top and bottom with squares of plywood and apply pressure by tightening the belts around the press. Allow your specimens several weeks to dry. Make labels for your collection and mount on poster-type paper. Laminate or cover with clear Con-Tact paper.



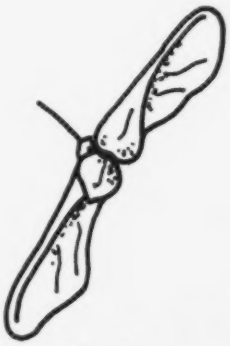
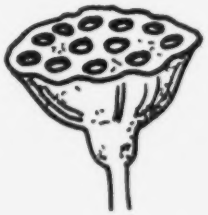
A PLANT PRESS

58

Kinds of Seeds

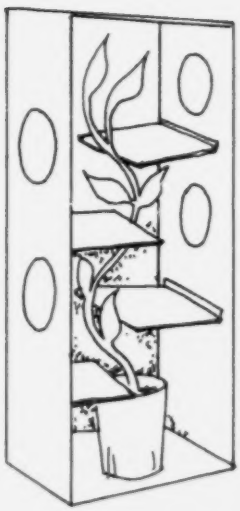
Seeds are the method higher plants use for reproducing themselves. Without some way of scattering the seeds, the parent plant would soon be choked by its own seedlings growing under and near it. Nature has devised many clever ways for scattering seeds, some of which you have observed. Using the list below, tell how each seed in the drawing below is usually spread. Give reasons for your answers.

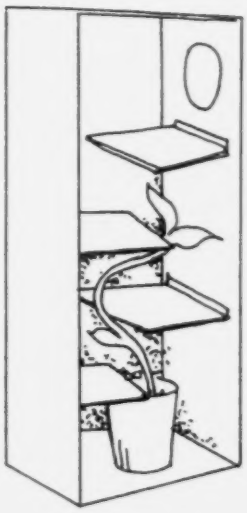
Wind	Stored by animals
Water	Bursting or popping of ripe fruit
Eaten by animals	Carried on the bodies of animals

 Maple	Coconut	Poppy	Blackberry
Cocklebur	Dandelion	 Lotus	Beggar's-Tick

FOR THE SUPER SCIENTIST: Make a seed collection of your own. List how many of the foods we eat are the seeds of plants. Make a list of the seeds in your family's spice cabinet.

Amazing Plants





This experiment will show you how plants react to light. The plant maze will take several weeks to complete, but it will be worth your effort and patience.

MATERIALS: Two fast-growing vine plants such as peas or beans, two boxes (shoe boxes will do), tape, lamp or window light, cutting tool

PROCEDURE: The plants should be several weeks old and about four inches tall when you begin the experiment. Cut the holes in the boxes as shown in the drawings above. Place the potted plants in the boxes. Cover the boxes so that the only light available comes in from the holes. Check the plants for water every few days and then retape. Keep plants on a windowsill or in front of another source of light. The response of a plant to light is called phototropism. This experiment illustrates phototropism.

QUESTIONS:

1. What differences do you see between the two plant mazes? What similarities?

2. What do you think would happen if there were no holes cut in the boxes?

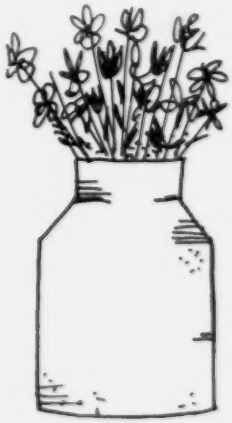
3. Plan another experiment to illustrate phototropism.

The Art of Drying Flowers

MATERIALS: Shoe box or similar container, clean dry sand or a mixture of cornmeal and borax

PROCEDURE: Pick the flowers you wish to preserve on a dry, sunny day. Remove those parts you do not wish to preserve, such as extra leaves and stem parts. Pour a shallow layer of sand into the box and place the stems of the flowers in the sand. Gently sprinkle sand around the stems. Continue to build up layers of sand until you reach the bases of the flowers. Carefully sprinkle the sand around the petals until the flowers are covered. The sand supports the petals and keeps the flowers from falling apart as they dry. A mixture of one part borax and three parts cornmeal can be used instead of sand. Allow the flowers to dry a week or two. Remove them carefully and arrange in a bouquet.

Daisies, chrysanthemums, carnations and black-eyed Susans dry well. Experiment with other flowers of your choice.



Natural Planters

Instead of a flowerpot or similar container, try using a natural container for a planter. Large seashells such as conchs or whelks, or eggshell halves for small plants make attractive natural planters.

MATERIALS: Empty seashells or eggshell halves, potting soil, sand (if you are planting a cactus or desert plant), small plants such as cacti or African violets, modeling clay or glue, wooden base, magic markers (if you want to color the eggshells), spoon

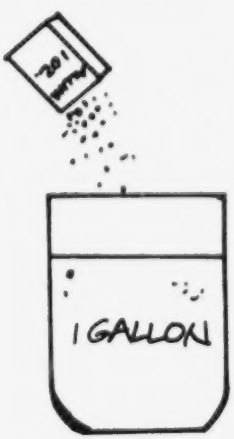
PROCEDURE: Wash the seashells and eggshells thoroughly and allow them to dry. Decorate the eggshells with magic markers if you wish and use the glue or modeling clay to attach them to a base. Allow the glue to set. If you are planting a cactus, make a mixture of sand and potting soil; otherwise just use potting soil. Use the spoon to put the soil into the seashells or eggshells. Carefully add the plant. Water and set in a sunny window. If you planted a cactus, it will need only a small amount of water every two to four weeks.

Plant Dyes

Color has been used by man in many interesting and useful ways since prehistoric times. The art of adding color to materials and fabrics is called dying. Throughout the ages, man has used many substances found in nature as dyes. Juices from berries and other fruit, peels from vegetables, parts of flowers, bark and the roots of trees were all used for dying. You can do some experiments with natural plant dyes by following the instructions below.

MATERIALS: Clean white fabric, such as muslin; alum (can be obtained from the spice section of a grocery store); onion peels; barberries; grape juice; carrot tops; goldenrod flowers; etc.; old stainless steel pot and lid; heat source; dowels or sticks; rubber gloves

PROCEDURE: 1. In each gallon of water, dissolve one ounce of alum. Alum is a mordant, a substance that helps dye stick to fabric. For each five ounces of material, make up one gallon of this mixture. 2. Place the material in the water and alum mixture in the pot; cover and simmer for about one hour. Leave the material in the pot several hours or overnight.



1

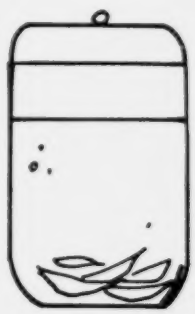
5 OZ. OF MATERIAL

2

Plant Dyes

3. Squeeze the material and rinse several times in water. 4. Prepare a mixture of the natural dye of your choice, such as onion skins and water in an old stainless steel pot. Simmer for about one hour. Remove the onion skins, berries, etc., and add the material which has been treated with alum. Be sure that there is enough water to cover the material.

3



4

5. Allow the material to simmer in the dye with the lid on until the desired shade is reached. Remember that wet material looks darker than dry. Allow mixture to cool. 6. Rinse the material until the rinse water runs clear. Dry the material. You may wish to experiment with other natural dyes and fabrics of your choosing. Always remember to keep the lid on the pot when experimenting with dyes, and do not inhale any vapors or fumes. Some plant fumes may be irritating or toxic.

5

6

Answer Key

Page 3:
1. d
2. b
3. a
4. c
5. e
6. f

Page 5:
Protozoa should be printed in capital letters.
No cross lines.
Gullet should be printed.
Caudatum should not be capitalized.
Grooves should be *groove*.

Pages 11,12:
Starting at 12 o'clock, arrange the pieces in this order: d, a, e, b, c, f.

Page 17:
1. Flea: Harmful, pest, carries disease.
2. Cockroach: Harmful, pest, carries disease.
3. Tumblebug: Helpful, eats decaying matter.
4. Mosquito: Harmful, pest, carries disease.
5. Butterfly: Both, pollinates, beautifies, also eats vegetation.
6. Termite: Harmful, destroys wood.
7. Bumblebee: Mostly helpful, pollinates flowers and makes honey, also stings.
8. Louse: Harmful, pest, spreads disease.
9. Silverfish: Harmful, eats a variety of materials.
10. Praying mantis: Helpful, eats other insects.
11. Potato beetle: Harmful, eats crops.
12. Dragonfly: Helpful. Its larvae are food for fish.

Pages 19,20:
1. Centipede is b.
2. Bee is b.
3. Insect is b.
4. Moth is a.
5. Snail is b.
6. Octopus is b.
7. Scorpion is a.
8. Caterpillar is a.
9. Lobster is b.
10. Clam is a.

Page 25:
2. Different parts of the body grow at different rates.
4. Answers will vary.

Page 26:
a. fresh
b. salt
c. fresh
d. fresh
e. salt
f. salt
g. salt
h. salt
i. salt
j. salt

Page 28:
1. Answers will vary.
2. Scaly
3. Cold
4. Reptiles
5. Turtles usually inhabit the sea. Tortoises inhabit the land, and terrapins live in the swamps and marshes.

Page 29:
1. band
2. murder
3. rafter
4. swarm
5. flock
6. litter
7. muster
8. horde
9. brace
10. exaltation
11. school
12. span
13. team
14. skulk
15. troop
16. yoke
17. drove
18. brood
19. clowder
20. pride

Page 31:
a. rattlesnake
b. coral
c. copperhead
d. water moccasin or cottonmouth

Page 32:
1. germ spot
2. chalaza
3. air space
4. egg white
5. yolk
6. shell membrane
7. shell

Answer Key

Page 33:

1. From the eggshell
2. The eggshell is thin.

Super Scientist:

The limestone will bubble due to the formation of gas as the acid reacts with the calcium compound in limestone.

Pages 34,35:

1. Salamander is a.
2. Monkey is a.
3. Crocodile is b.
4. Lion is b.
5. Indian elephant is b.
6. Walrus is a.
7. Frog is a.
8. Moose is b.
9. Turtle is b.

Page 36:

1. g; 2. e; 3. l; 4. f; 5. j; 6. c; 7. i; 8. h; 9. b; 10. d; 11. k; 12. a

Page 41:

1. c; 2. b; 3. d; 4. e; 5. a

Page 42:

1. Whales need to surface quickly to breathe air.
2. Right whale
3. Whales are mammals, warm-blooded, breathe air and give birth to living young. Fish are cold-blooded, breathe with gills.

Pages 43, 44:

a. is a killer whale	(3)
b. is a humpback whale	(1)
c. is a sperm whale	(5)
d. is a narwhal	(4)
e. is a blue whale	(2)
f. is a bowhead whale	(6)

Page 47:

All the animals are real. The dodo and quagga, however, are extinct.

Page 48:

1. j; 2. h; 3. d; 4. e; 5. b (nests); 6. g; 7. a; 8. c; 9. f (nests); 10. i (webs)

Page 49:

Producers: green plants including corn
First level: rabbit, mouse
Second level: frog, owl, (also bobcat and hawk)
Third level: hawk, bobcat, snake
Decomposers: Small animals and bacteria in soil and water

Page 53:

Maple—wind
Coconut—water
Poppy—bursting and popping
Blackberry—eaten by animals
Cocklebur—carried on the bodies of animals
Dandelion—wind
Lotus—water
Beggar's-tick—carried on the bodies of animals

Page 54:

1. Answers will vary.
2. The plants would die.

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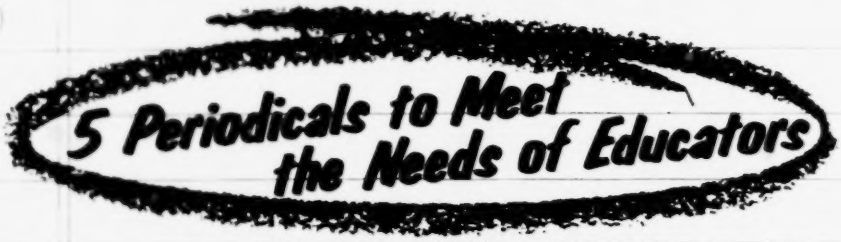

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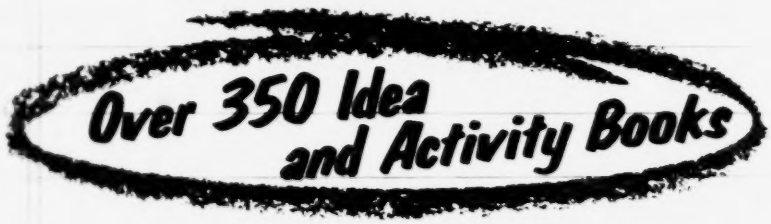

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